THE PLANT DISEASE BULLETIN

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WHEAT

The Take-All Survey

The Plant Disease Survey, in cooperation with the Office of Cereal Investigations and Plant Disease Survey collaborators, has continued the take-all survey the present season. Posters illustrating take-all and flag smut, together with descriptive literature were distributed by collaborators to county agents, growers, and others in all the wheat-growing states. Effort was made in this and in other ways to develop interest in a wheat news service, with especial reference to take-all and similar troubles. Travel letters were issued to collaborators in order that diseased spots reported in wheat fields might be visited and the conditions personally investigated. In this way we hoped to accumulate, during the season of 1921, extensive information on the distribution and severity of take-all and other foot rots and root rots of wheat, and also a body of comparative field data of value to those investigating this type of disease.

The plan has worked well. Many specimens suspected of having take-all have been sent to the state experiment stations and the suspicious cases personally investigated by collaborators and by federal pathologists. The survey is still under way and only a progress report can be made at this time. A complete report will appear in a later issue of the Bulletin when the survey has been completed and final reports have been received from all states.

Thus far, Ophiobolus (probably Ophiobolus graminis) has been found this year in New York, Indiana, Arkansas, and Oregon where it is associated with extensive diseased areas in wheat fields. In addition, important outbreaks of foot rot and root rot, with which Ophiobolus has not yet been definitely connected, have been investigated in Illinois, Kentucky and Kansas, with less extensive occurrences elsewhere.

New York: Ophiobolus was first reported from New York in 1920 where it was found July 15 in a single spot in a field at East Rochester, Monroe County.

On June 4, 1921, Mr. L. C. Tyler, field assistant of the Cornell Agricultural Experiment Station, found Ophiobolus in fields near Batavia in Genesee County. Mr. Tyler has published the following report in the New York State Agricultural College Weekly News Letter:

> "On Saturday, June 4, take-all disease of wheat (Ophiobolus graminis) was discovered in several fields just northeast of Batavia. A further survey was made and a total of nine fields were found to contain the disease. In practically all of the diseased fields there occur a large number of irregular rounded or oblong dead areas varying in size from one foot or less to six or eight feet in diameter. In many cases isolated diseased plants could be found surrounded by plants which were apparently normal. Little relation can be seen thus far between the occurrence of the spots and the topography of the fields. In two or three poorly drained areas the disease seemed somewhat more severe. Seemingly, as many spots are found on high ground as on low ground. Neither does the type of soil seem to affect the occurrence of the fungus. Many dead areas are surrounded by some of the best and largest wheat in the fields. The growers practice a three to five

year rotation which frequently includes oats and wheat or barley and wheat on successive years. The wheat straw on some of the farms examined is regularly returned with the barnyard manure to the soil. The fields which were most seriously affected had received an application of manure which included wheat straw within the last two years. In one case two adjacent fields on the same farm were planted with seed from the same source on similar soil. One (manured in 1920) was badly diseaseed while the other (last manured in 1917) was apparently free from take-all. Further information which would throw light on the method of spread of the fungus is very badly needed. The growers with one exception report that they have not observed such diseased spots in their fields in previous years."

H. E. Thomas and R. S. Kirby have visited Genesee and neighboring counties and find Ophiobolus prevalent in a large territory south of Lake Ontario, including several counties. The disease is most severe in fields of No. 6 Junior, a variety of wheat developed in western New York and now being improved and extensively grown. The situation is further complicated by Kirby's discovery of the disease. on Agropyron repens. He says:

"Friday, June 10, Dr. Thomas and I went over a number of wheat fields in Genesee County (Batavia). The situation there is very serious on account of the general prevalence of the disease in so many fields. I also found Agropyron repens infected with the take-all. The general prevalence of this grass in so many fields will almost defeat any effort of control of this disease by rotation."

Kentucky: Valleau submits the following report:

"On May 13 and 14 I made an inspection trip through Logan and Christian Counties where there have been reports of considerable trouble in wheat. I was unable to find any signs of the flag smut or take-all, but there was considerable evidence of severe rot in practically every field that we examined. In the worst fields it appeared to be the cause of severe stunting of certain plants, these plants never attaining a height of more than 3 or 4 inches when they died at about blossoming time. Other plants did not stool out, and sent up only a single short stalk which produced a small, short head; others stooled out and in many cases most of the shoots died when about 4 to 8 inches high. The remainder, however, fruited normally. We have found the same conditions to exist in most of the fields examined about Lexington. The cause of the root trouble I have not definitely determined, but from some work done the past winter on root diseases of wheat, in which about sixty varieties were worked with, I found rather a high percentage of seed infection with Helminthosporium and also some wheat scab infection. There was a marked contrast, between fields planted from the ordinary varieties and from pure line selections. Where Ashland was used, the stand, by actual counts made by Mr. Kenney, was 25% better than the stand of

Currell's Prolific which is a mixture of strains. This increased stand was due primarily to greater uniformity in the number of culms produced, practically none of the severely stunted plants being found. It appears from our work so far that this root trouble may be handled to quite an extent by selecting resistant strains and eliminating the low yielding very susceptible strains from our varieties. I feel fairly confident that the percentage of seed infection with pathogenic organisms capable of causing root rot is sufficiently high so that practically complete root infection will take place in the field very soon after the seed is sown."

Arkansas: Rosen found Ophiobolus associated with serious foot rot in two fields near Fayetteville. The first field had been used as a red top and timothy pasture for twelve to fourteen years. The soil is a fine silt loam, poorly drained, though not particularly lacking in plant food. Although worse in spots, the disease was generally prevalent throughout the whole field of eleven acres, with no noticeable relationship between the diseased spots and topography of the field. Another wheat field on the same farm had no sign of the Ophiobolus disease, although the seed came from the same source as the badly diseased field. The healthy field had been previously fertilized, and as far as the owner knew, was entirely similar in all other respects to the diseased field.

The second infested field resembled the first in character of soil and in poor drainage. Ophiobolus was confined to three acres which had been in a peach orchard until last fall, when the trees were cut and wheat sown. The remainder of the field was in wheat last year, corn in 1919, and clover for three years previous to that.

The source of the infection in these cases did not appear to be diseased seed, and careful search was made in and about the infested fields for signs of the disease on wild grasses. Species of Festuca, Bromus, and Hordeum were found which seemed to have the disease although no perithecia were present. A letter just received from Dr. Rosen reports typical perithecia of Ophiobolus on the perennial foxtail, Setaria geniculata, collected on the college campus at Fayetteville.

Indiana: Jackson recently found immature Ophiobolus associated with diseased spots in three fields on a farm near Vincennes in Knox County, southwestern Indiana. The spots were mostly small, and the damage to the crop slight.

The quarantined area in Porter and LaPorte Counties where so-called take-all was present last season has been repeatedly examined this year. The disease has reappeared in the experimental plats at Wanatah, but not in commercial fields. Mr. J. B. Kendrick on June 17 again visited the quarantined area and examined both spring and winter wheat but no take-all was found.

Illinois: The so-called take-all has appeared again this year in the quarantined area in Madison County. In addition, Dungan reports the disease in one field of Red Cross wheat near Lincoln, Logan County, where it has developed in typical form. Conditions in the field indicate that the disease has been distributed by farm implements and by the feet of the work horses.

Kansas: An interesting and serious foot rot has developed in many fields in

Dickinson County and in one field in Saline County, and has been given special study by Melchers and Mc Kinney. The causal organism has not yet been definitely determined. There are points of resemblance to, and also of difference from, the so-called take-all of Madison County, Illinois, and the Ophiobolus disease found in Arkansas by Rosen. McKinney says: "It is my belief that we are seeing the beginning of a disease which is capable of causing much destruction."

Mr. John T. Pearson has been surveying the Dickinson County region and says:

> "So far as I have been able to observe, the character of the soil and the variety of wheat have little, if anything, to do with whether or not the field is diseased with foot rot. In Dickinson County foot rot occurs in both soft and hard wheat fields and in Kanred wheat fields. I have located the disease on land that has been under cultivation thirty years or more and in fields that have been broken from the prairie not more than six or eight years. However, I have never found it in fields where crops have been rotated and the ground was not in wheat last year. Many of the fields where I located foot rot have been in wheat every year for the past eight or ten years."

Root rots of different character from the foot rot in Dickinson County have been reported in serious amounts from numerous other points in Kansas. Melchers writes under date of June 6:

> "As the matter now stands, it seems as though we have two distinct problems in the state. The one in Dickinson County where the wheat is dying out in spots, has also been found at our agronomy farm here in Riley County. Probably the same trouble exists in Cheyenne and Ellis Counties. From the majority of fields which have been reported injured and where Mr. Pearson has made examinations, we find another trouble which no doubt is the most common in the state this year. Plants are dying more or less all over the field. I attribute this injury to a number of factors in combination with one another.
>
> "The late freezes caused a great deal of refuse to accumulate on the ground and chiefly around the crown of the plants. In many places there was a considerable lack of rain. The soil also has been seriously depleted in many of these fields. Placing the plants under these conditions, together with excessive tillering, has produced a strain on the root system which it cannot meet. I believe that a great deal of this refuse material is a harboring place for semi-saprophytic and partially parasitic organisms which together with the organisms in the soil, have been responsible for a decay of the root system."

<u>Washington:</u> A very serious foot rot has developed in the vicinity of Spokane, exceeding the condition found there last year. Heald makes a preliminary report as follows:

> "For two days I have been looking over wheat fields near Spokane. The foot rot condition seems worse after the second day's work. One field showed 100% infection. The disease seems much more serious than in previous years. I wish you could see some of the <u>wrecked</u> wheat fields. They certainly beat anything I have seen before."

<u>Oregon:</u> Barss has found Ophiobolus in the neighborhood of Hillsboro and suspects that the same disease exists in a number of other sections of the state

from which reports of spotted wheat fields have been sent in. These reports are now being investigated and the fields examined. The loss in some cases is estimated at one-third of the crop, the spots ranging up to 100 feet in diameter.

Flag Smut caused by Urocystis tritici

During the present season further survey work on flag smut has been conducted by the Illinois State and the United States Departments of Agriculture. A rather extensive survey was made of wheat fields along the Mississippi River, northwestern Tennessee, southeastern Missouri and western Illinois as far north as the junction of the Mississippi and Missouri Rivers. Some work was also done up the Missouri River Valley through Warren and Franklin Counties and up the eastern side of the Illinois River Valley to Mason County. Between seven and eight thousand acres of wheat were inspected in the Mississippi bottom lands between Cairo and East St. Louis.

A more intensive search was made in wheat fields within the quarantined area about Granite City and in the vicinity.

As a result of this season's work two important facts regarding the geographical range of flag smut have been developed. (1) The original Granite City area, where flag smut occurs, has been enlarged and extended and (2) a new center of infection, which may be called the Dupo area, has been located south of Granite City in St. Clair County, Illinois.

In the Granite City district flag smut was found last year in 111 fields on about 66 farms. This year it was found to be present in 211 fields on 121 farms, an increase of 100 fields over last year. The reason for this may be explained in two ways: In the first place, more men and a longer working period gave opportunity for a more thorough and extended search than in 1920; and in the second place, it is probably true that the disease has spread during the past year to new fields. The area of infestation about Granite City as known today is about 13 miles long and 6 miles wide at the widest point, and comprises an area of approximately 50 square miles.

The Dupo area, south of East St. Louis, and which was found for the first time this year, has been delimited by survey and found to contain 57 infested fields on 30 farms. It is more or less rectangular in

shape and is about 3 x 3 1/2 miles in dimension with two rather small outlying areas. About one-third of the infested fields are on bottom land and the other two-thirds are up on high land, about 200 feet above the river flood-plain.

Regarding the seriousness of flag smut in these districts, it may be said that it is not causing any appreciable loss at present. In a majority of fields only a trace of the disease was found so that for the region as a whole there will be no loss. In a few fields, however, spots were found where a slight reduction in yield was being caused. By far the highest percentage of affected plants was found in one field that showed an average of 15%. This was an exceptional case, but it goes to show that the disease can become serious under Illinois conditions. A comparison with last year's data with this year's indicates that the disease is not progressing in severity but is being held in check and perhaps slightly reduced, if anything.

In the light of this season's survey work the quarantined boundary lines have been extended to cover the areas of infestation and a vigorous control program is being instituted by the Illinois State Department of Agriculture, under the leadership of P. A. Glenn. In general, the plans for controlling the disease are as follows:

(1) All grain is to be treated at the threshing machine as it comes from the separator by spraying it with concentrated formaldehyde at such strength and rate as will kill the smut spores and make the seed useless for planting purposes.

(2) Threshing machines used for threshing grain grown inside of the infested areas, are not to be used outside the quarantined zones during the present year.

(3) Threshing machines inside of the areas must be disinfected with formaldehyde before threshing oats or other grains the straw of which the farmers wish to preserve.

(4) Machines that have been used for threshing wheat must be disinfected with formaldehyde at the close of the season.

(5) Farmers are required to plant such varieties as the State Department of Agriculture shall recommend. These varieties will be those that have shown resistance to flag smut during the past two years.

(6) Seed is to be treated with copper sulphate and lime before planting in the fall.

(7) Wheat straw is to be burned by September 1, 1921.

A more complete report of the flag smut survey will be given in a later number of the Plant Disease Bulletin.

Wheat nematode (Tylenchus tritici)

A. C. Foster, Extension Plant Pathologist with the North Carolina Experiment Station and Collaborator with this Office, reported that nematode galls in wheat heads were received at West Raleigh on April 10 from A. J. Hendren, County Agent for Wilkes County, North Carolina. More recent letters from Mr. Hendren state that nematode galls had been located on about a dozen farms in widely scattered localities in the county and in several instances the disease had become serious. Foster recently made a survey for nematode and other wheat diseases in North Carolina, during which he visited Buncombe, Wilkes, Surry, Alexander, Yadkin, Forsyth, Rockingham, Guilford, and Durham Counties. These are the leading wheat producing counties in the state, and are said to obtain most of their seed wheat from Virginia. Nematode was found only in Wilkes County, where it was prevalent and serious in two sections. Foster was able to trace the source of the seed wheat used in the infested plantings. The following quotation is taken from his report, dated June 23:

> "In Wilkes County wheat nematode was reported to occur for the first time in this state. We found wheat nematode galls in two sections, rather prevalent where found, and possibly causing a loss of 10-20% of the crop. It was rather common in this section last year and some of the growers claimed they had observed it in their wheat and that of certain neighbors for the past five years, varying in the amount of damage done. I traced the history of the seed wheat planted and it was always traced to wheat which originally came from Virginia, through the Wood Seed Co., of Richmond. I inspected the mills in the county, and while I did not find evidence of galls in the screenings, the millers claimed to have found them last year."

Downy mildew caused by Sclerospora macrospora Sacc.

During the course of the wheat flag smut survey conducted by the Plant Disease Survey in cooperation with the Office of Cereal Investigations, L. W. Leukel discovered a disease of wheat at Union City, Tennessee on April 19 which is new to the United States. Specimens sent to Madison, Wisconsin and also to Washington showed the disease to be caused by the downy mildew Sclerospora macrospora. W. H. Weston of the Office of Cereal Investigations immediately went to Union City and made a study of the disease there. The report of his observations and the statement of the general situation has just been issued as Department Circular 186, United States Department of Agriculture. Collaborators and others should obtain this circular which gives the present status of the disease including geographic range, symptoms, hosts, losses, etc.

During the present season the disease has been found in the following places: Tennessee, Jackson County (Jackson), Obion County (Rives, Hossier Valley, Union City, and Woodward Mills); Kentucky, Fulton County (Jordan and vicinity). According to Weston it seems probable that it will be found in adjacent counties in Illinois and possibly in Arkansas and Missouri. Diseased specimens in the pathologic herbarium at Berkeley, California, show that downy mildew occurred on wheat in Kings County, California, in May 1919.

The losses in western Tennessee and Kentucky are apparently very slight. Downy mildew occurs on wet, poorly drained land where large numbers of plants are affected and destroyed, but as such areas represent only a very small proportion of the whole wheat district, and as the disease is closely restricted to these poorly drained localities, the total loss is not great. However, the loss is

persistent year after year so that in the aggregate it becomes considerable. In certain restricted areas in Europe there have been occasional reports of very severe destruction of wheat and maize. There is reason to believe, therefore, that under conditions favorable to the disease it may become of considerably more importance in the United States than at present.

Not only did Weston find wheat affected in western Tennessee, but also Bromus commutatus Schrad. In Europe the disease is found commonly on maize and occasionally on oats, barley, rye, and several wild grasses of the genera Phalaris, Phragmites, Glyceria, Agropyron, and Lolium.

Weston states that general indications from field conditions in Tennessee and Kentucky are that "the disease is not of sudden or recent appearance, but has been present for many years". This statement together with the known occurrence of the disease in California in 1919, indicates that careful search may reveal the presence of downy mildew in other states.

Leaf rust caused by Puccinia triticina.

Leaf rust is apparently causing much more injury than usual this year in a number of states, including New York, Virginia, West Virginia, Tennessee, North Carolina, Texas, Oklahoma, and Ohio. In West Virginia the disease has been so severe in the Kanawha and Ohio Valley that on May 13 a 50% reduction in yield was feared in that section. The poorest crop of wheat produced in years is reported from Buncombe County, North Carolina, due mainly to leaf rust, which is severe in other counties of that state also. In Tennessee, according to C. D. Sherbakoff, the disease appeared much earlier than usual and caused damage estimated at about 10%, ranging from very light in the case of late planted fields or those with rust resistant varieties to about 40% in the earlier planted fields and those with susceptible varieties. In Oklahoma also leaf rust is said to have caused most deterioration in the earlier fields.

Stem rust caused by Puccinia graminis.

No reports have been received indicating any general damage from stem rust.

FRUITS

Frost injury to fruit crops.

The heaviest damage to fruit from the frosts of March and April occurred in a belt extending through the central portion of the country, including the southern part of New England to North Carolina and westward to the Rocky Mountains. The amount of injury diminished northward, due perhaps to the fact that the fruit buds did not develop so early: and southward, where the freezes were not so severe. In general the Pacific Coast States, except parts of California, Idaho, and Utah escaped severe damage, although in some cases cold weather at blooming time prevented a normal set of fruit. According to recent estimates, the main fruit-growing sections of Colorado will probably produce good crops.

Of the southern states, New Mexico and Arizona suffered severely, and some damage was sustained by the more susceptible fruits in the Gulf States and Georgia.

A more detailed account of the effects of the frosts is given by E. V. Wilcox in the Country Gentleman for June 18, page 6.

Collaborators' reports are given below.

Apple

Massachusetts: The apple crop was hard hit in all parts of the state by the freeze of May 12. The most serious damage, however, was in the eastern part of the state, especially in Middlesex County, where from 75-90% of the fruit set on Baldwin and McIntosh was ruined. Early varieties such as Gravenstein did not suffer to any great extent. The same varieties were injured in the western part of the state, but a much smaller percentage was ruined. (Osmun, May 24).

New Jersey: The apple losses due to frost will amount to fully 50%. (Cook, May 16).

Pennsylvania: Probable percentage of normal crop as reported by county agents ranges from 5% to 85%, averaging 41% in the counties reporting. These figures are in some cases perhaps too low. They represent more nearly the percentage of blossoms killed. (Thurston, June 1).

Delaware: Probably 50 to 60% of the apples have been killed and I am inclined to believe that more than 60% will fall before the season is over due to frost trouble. (Manns, May 13).

Apples were not so severely affected as the pears and peaches in the frost of March 27 and 28. The early leaves are badly frost blistered. The following estimate of a normal set is observed for named varieties: Williams and Staymans 40-50%, Rome 80%, York 75%, Jonathan 30-50%, Grimes 10%, Paragon 25%, Duchess, Nero, and Yellow Transparent 10%. Dean McCue estimates a 50% reduction in yield of apples from frost. (J.F. Adams, May 14).

Virginia: The cold and frost injury to the fruit crop of this state has been extremely severe. The injury to apples appears to vary somewhat in different sections. Here at Blacksburg we do not have a single apple left on the trees and that condition seems to be true of southwestern Virginia in general. There is a light crop in the Shenandoah Valley section on certain varieties and the crop in certain sections of the Piedmont area, especially in the northern part, seems to be less injured than in other parts of the state. I have heard of some orchards in this section that will probably have 20% of a crop. The apple crop of the state as a whole will probably not exceed 8% or 10% at the outside. (Fromme, May 13).

(Rockbridge County) - From what I can learn all fruits in this county, and apparently in this whole region, have been practically completely destroyed. A few late blooming apple trees have a few fruits on them, but not enough to count. From the reports, there will be practically no apples produced in this region this year. (W. D. Hoyt, June 11).

West Virginia: The apples in the Kanawha Valley are reported as not more than 2 to 5% of a crop and many of these show frost bands. In the eastern part of the state (Berkeley and Jefferson Counties) the crop is very irregular, some orchards claiming 100% and showing evidence of that much at present. Other orchards have practically nothing. (Giddings, May 13).

Kentucky: The fruit crop, including peaches, cherries, and apples, has been completely ruined throughout the Bluegrass section of Kentucky and probably along the Ohio River in the western end of the state, although I am not positive as to the extent of injury there. In the southwestern part of the state in Christian and Logan Counties, late apples were not injured to any great extent, although they were in partial bloom at the time of the last freeze. (Valleau, May 16).

North Carolina: The frost killed all the apples in the mountain section. I was at the Pender Test Farm Tuesday and made it a point to note carefully

the damage done there by the frosts. All the apples were killed. (Foster, April 23).

Arkansas: All fruit except a small percent of late strawberries was killed by frost in northwest Arkansas during April. (Elliott, May 16).

Ohio: There appears to be but a very light proportion of apples left uninjured from the latitude of Columbus southward. The large growers of the southeastern Rome Beauty district report practically everything killed by the freeze except a small proportion of late blossoms which may set some fruit. In the south-central area late blooming varieties indicate half a crop or more. The condition of the central portion of the state is represented by a Licking County report of April 12 stating 50% of Grimes and Jonathan buds alive, Rome, Spy, and York but slightly injured; thus from Columbus northward injury to apples is slight and confined to early blooming varieties (Astrachan, Baltimore, Bentley (sweet), Duling, Early Harvest, Gravenstein, Mann, Ohio Nonpareil, Oldenburg, Tompkins King). Apples of blooming period coincident with that of Rome Beauty or later have suffered practically no injury. (Selby, May 14).

Illinois: The apple crop will be about 10% of a normal crop. The southern third of the state will have about 5%, the central portion 10-15%, and the northern portion 30-40%. Since the larger portion of the apples are grown in southern Illinois, this means a proportionately heavier loss than if the greatest damage had occurred in the northern part of the state. The damage to different varieties varies greatly in different sections of the state and in different orchards. In some cases early fruit suffered more severely than late fruit, and in other cases the reverse was true. In general early varieties suffered most severely. The extreme southern end of the state depends largely upon early varieties such as Duchess and Transparent, and consequently the loss there has been usually heavy. A great deal of indirect damage was done by the freeze, as indicated by the heavy June drop. In some cases apples which had started to grow stopped developing and were found to be black in the core. These of course all dropped. (Anderson, June 9).

Nebraska: Late blooming winter apples such as Jonathan, Winesap, Black Twig, Ben Davis, etc., promise from 10-60% of a crop in eastern Nebraska. (R. F. Howard, May 17).

Utah: Frost injury to fruit in the various districts of Utah that I have visited has not been quite so severe as was first reported. Apples did not suffer particularly from the frost during the month of April. The whorls of leaves around the blossom clusters are badly crinkled and frost blistered but the blossoms themselves seem to have remained untouched by the low temperatures. Orchards throughout the districts that I have seen bloomed quite profusely, although the bloom was not so heavy in some varieties, particularly Winesap. The general low temperatures throughout April, aside from the actual freezes, contributed to lack of pollination inasmuch as insects were not abundant in the orchards. (O'Gara, May 16).

Nevada: The fruit crop of northern and central Nevada is almost a total loss this year because of frost. The temperature was unusually warm this year in January and February. This caused the buds to swell very early and was followed in April by severe frosts throughout the month. Apples are almost a total loss in central and west-central Nevada. (Lantz, May 23).

Oregon: Around Medford and Central Point in Jackson County apples were not hurt. In the Umpqua Valley, in Douglas County there was no injury whatsoever to fruit from frost. No injury is reported in the Willamette Valley. No frost damage to fruit has been reported to the eastward along the Columbia River. (Barss, May 18).

Pear

Massachusetts: In the eastern part of the state pear fruit was almost totally ruined. (Osmun, May 24).

Pennsylvania: Probable percentage of normal crop 75% in Center County, 50% in Schuylkill County. (Thurston, June 1).

Delaware: All pears are killed. (Manns, May 13).

Pears were severely affected by the freeze of March 27 and 28 and the damage is represented not only by the complete loss of fruit but also with considerable of the new growth being killed. In many sections the trees from a distance now appear as if severely affected with fire-blight. Dean McCue estimates pears a total loss in Delaware. (Adams, May 14).

Virginia: (Rockbridge County) - From the reports there will be no pears produced in this region this year. (Hoyt, June 11).

Ohio: Very severe injury from freezing reported over entire state outside of the lake protected area. Practically no Kieffer pears escaped destruction from Wooster southward. A small proportion of some other varieties have set in the latitude of Wooster. The proportion in the lake shore area is not known to us. (Selby, May 14).

Illinois: Pears seem to have suffered worse than any other fruit and I know of no orchard where there are any pears at all, although I have not heard from northern Illinois. (Anderson, June 9).

Utah: Pears have suffered some but in the main there seems to be a fairly good set, although I am of the impression that the drop will be heavy. Bartlett pears seem to be lighter than the other varieties. (O'Gara, May 16).

Nevada: Pears are almost a total loss in central and west-central Nevada. (Lantz, May 23).

Oregon: Around Medford and Central Point in Jackson County, which is the center of a large pear growing district, those pear orchards which were smudged at the proper time came through all right, but practically all of the pears which were not smudged around those two centers at least were very badly injured by the frost and it is expected that this section of the state will harvest only about 50% of a crop as a consequence. Going northward into the Umpqua Valley, we find that in Douglas County there was no injury whatsoever by frost to fruit. Farther north in the Willamette Valley no injury is reported to fruits other than peaches. To the eastward along the Columbia River no frost damage to fruit has been reported but in the Walla Walla Valley it is reported that pears were hurt to some extent, but no exact estimate is available. (Barss, May 18).

Peach

Massachusetts: Peaches were not hurt by the freeze of April 19 and 20. (Osmun, May 24).

New Jersey: The peach losses of the state due to frost will amount to fully 75%. (Cook, May 16).

Pennsylvania: Probable percentage of normal crop ranges from none in Delaware County to 75% in Erie and Northampton Counties. The most severe injury occurred in the southern and southwestern parts of the state, several counties reporting only 2% or 5% of a crop. The average crop in the counties reporting is about 25%. (Thurston, June 1).

Delaware: All the peaches are killed. (Manns, May 13).

Peaches, particularly the early varieties, are a complete loss, due to the frost of March 27 and 28, but to date no serious injury to the new

growth has been observed. Dean McCue estimates a 95% reduction in yield of peaches from frost injury. (Adams, May 14).

Virginia: The cold and frost injury to the fruit crop of this state has been extremely severe. Peaches seem to be practically all destroyed throughout the state. (Fromme, May 13).

(Rockbridge County) - From the reports, there will be no peaches produced in this region this year. (Hoyt, June 11).

West Virginia: The stone fruits are very largely killed in the eastern and southern parts of the state. I am not so certain as to conditions in the central part. (Giddings, May 13).

Kentucky: The fruit crop, including peaches, has been completely ruined throughout the Bluegrass section of Kentucky, and probably along the Ohio River in the western end of the state, although I am not positive as to the extent of injury there. (Valleau, May 16).

North Carolina: I understand the peach crop has been wiped out over the entire state with the exception of the area around what is known as the "sand hills", near Pinehurst and Southern Pines. (Foster, April 23).

South Carolina: Peaches have been damaged very seriously in some places, and in others not enough to obviate the necessity of thinning. (Ludwig, May 14)

Arkansas: All fruit except a small percent of late strawberries was killed by frost in northwest Arkansas during April. In the southern part of the state peaches escaped. (Elliott, May 16).

Ohio: Peaches are reported killed by freezing in the whole state except the peninsula and island district of Ottawa County, and the peach orchards adjacent to Lake Erie in other counties. (Selby, May 14).

Illinois: Peaches are grown almost exclusively in the southern half of the state, although there are a few scattered orchards in the northern portion of the state. The southern peach crop is completely killed, except a few orchards north of Cairo. It would be safe to say that there is less than one percent of a crop. (Anderson, June 9).

Utah: Frost injury to fruit in the various districts of Utah that I have visited has not been quite so severe as was first reported. It was thought that there would be very few peaches, but it now appears that there will be a good peach crop. It may be assumed that Utah will have a much better fruit crop than was anticipated even two weeks ago. (O'Gara, May 16).

Nevada: Peaches are almost a total loss in central and west-central Nevada. (Lantz, May 23).

Oregon: In Jackson County in the Rogue River Valley and probably in Josephine County the peach crop was wiped out by frost. In the Willamette Valley peaches are damaged by frosts to the extent that only about 15% of a crop will be harvested. In the Walla Walla Valley it is reported that peaches were hurt to some extent but no exact estimate is available. (Barss, May 18).

Plum and prune.

Massachusetts: On April 19 and 20 plums were injured to some extent, especially in the western part of the state. The freezing, however, resulted only in thinning out of the blossoms and there will be a good crop unless further injury occurs. (Osmun, May 24).

Pennsylvania: Plum crop very light in most of the counties reporting, ranging from none in Greene and Lycoming Counties to 85% in Wayne County, but mostly from 5% to 15%, averaging about 20%. (Thurston, June 1).

Delaware: All the plums are killed. (Manns, May 13).

Dean McCue estimates plums a total loss in Delaware. (Adams, May 14).

Virginia: Plums were also almost a complete loss. (Fromme, May 13).
(Rockbridge County) - From the reports, there will be no plums produced in this region this year. (Hoyt, June 11).

West Virginia: The stone fruits are very largely killed in the eastern and southern parts of the state. I am not so certain as to conditions in the central part. (Giddings, May 13).

Arkansas: All fruit except a small percent of late strawberries was killed by frost in northwest Arkansas during April. (Elliott, May 16).

Ohio: Plums appear to have been destroyed by frost injury essentially over the same area as that described for peaches. (Selby, May 14).

Nebraska: Plums practically all killed. (Howard, May 17).

Utah: The plum crop is light. (O'Gara, May 16).

Nevada: Plums are almost a total loss in central and west-central Nevada. (Lantz, May 23).

Oregon: In the Umpqua Valley, in Douglas County, there was no injury whatsoever by frost in the fruit, although some considerable shedding in the prune orchards is now said to be taking place as a result, perhaps, of cold rains at the bloom period. In the Willamette Valley no injury is reported to prunes from frost although there is a very light stand due to cold, wet weather at bloom time. It seems now that perhaps not more than 20% of a crop will be harvested in this section. (Barss, May 18).

Cherry

Massachusetts: On April 19 and 20 cherrries were injured to some extent, especially in the western part of the state. The freezing, however, resulted only in thinning out of the blossoms and there will be a good crop unless further injury occurs. (Osmun, May 24).

Pennsylvania: Cherries severely injured over most of state; total loss in several widely separated counties, probable crop mostly from 2-10%, but 75% reported in Crawford County, and 50% in Wayne County. Average crop about 12%. (Thurston, June 1).

Delaware: All the cherries, except wild cherries, are killed. (Manns, May 13).

Virginia: Cherries were almost a complete loss. (Fromme, May 13).
(Rockbridge County) - From the reports there will be no cherries produced in this region this year. (Hoyt, June 11).

West Virginia: The stone fruits are very largely killed in the eastern and southern parts of the state. I am not so certain as to conditions in the central part. Mr. Berg reports sour cherries as being the only stone fruit which shows any crop in the Kanawha Valley section, and it shows injury from frost. (Giddings, May 13).

Kentucky: The fruit crop, including cherries, has been completely ruined throughout the Bluegrass section of Kentucky and probably along the Ohio River in the western end of the state, although I am not positive as to the extent of injury there. In the southwestern part of the state in Christian and Logan Counties, cherries were apparently not injured. (Valleau, May 16).

Ohio: No available data on sweet cherries as to limits of injury, which has been marked southward. Sour cherries show part of a crop over nearly the entire state, with larger proportions set in the northern third, possibly not reaching a full crop except in the areas where peaches and plums survived freezing injury. (Selby, May 14).

Nebraska: Sour cherries promise from 10 to 30% of a crop. (Howard, May 17).

Utah: The sweet cherry crop is light. Sour cherries seem to have come through the freeze in fair shape. (O'Gara, May 16)

Nevada: Cherries are almost a total loss in central and west-central Nevada. (Lantz, May 23)

Strawberry

Massachusetts: Strawberries in the eastern part of the state suffered about 50% damage on May 12. In the western section the injury was negligible. (Osmun, May 24)

Delaware: Strawberries have been injured some but not as much as was at first supposed. (Manns, May 13)

In the freeze of March 27 and 28 strawberries were slightly affected. At the time of the second freeze, April 11 and 12, they were more advanced and were hit hard. They have recovered from this setback and probably a 70% crop will be harvested. (Adams, May 14)

Virginia: (Rockbridge County) - From what I can learn all fruits in this county, and apparently in this whole region, have been practically completely destroyed. The only fruits left are the blackberries and some strawberries. (Hoyt, June 11)

Kentucky: An occasional strawberry bed was injured slightly, but the loss will be practically nothing in strawberries. (Valleau, May 16)

Arkansas: All fruit except a small percent of late strawberries was killed by frost in northwest Arkansas during April. (Elliott, May 16)

Illinois: Strawberries were injured, and I should estimate a third of a crop for this locality (Urbana), and about 50% of a crop in southern Illinois. (Anderson, June 9)

Nebraska: Strawberries promise practically a full crop. (Howard, May 17)

Other fruits

Pennsylvania: Grapes not injured or only slightly so in most counties. In Erie County 35% of a crop is reported, in Lancaster County 80%, in Juniata County 90%, otherwise the crop is practically uninjured. The average crop is about 93%. Bush fruits were also not badly hurt, the average crop being about 90%. (Thurston, June 1)

Delaware: Grapes are hit heavily, hard to tell how much yet. (Manns, May 13)

Grapes were slightly advanced at the time of the first freeze, March 27 and 28, but not more than .5% of the advanced buds were affected. The second freeze, April 11 and 12, killed 90% of the new shoots. Growth has recovered and adventitious buds are developing. Dean McCue

estimates 70% reduction in yield of grapes as a result of frost injury. Currants and gooseberries show considerable injury to leaves following second freeze and only 50% of a normal set of fruit is expected.

Virginia: (Rockbridge County) - From what I can learn all fruits in this county, and apparently in this whole region, have been practically completely destroyed. The only fruits left are the blackberries and some strawberries. (Hoyt, June 11)

North Carolina: All of the grapes at the Pender Test Farm were killed. (Foster, April 23)

Illinois: Raspberries and blackberries escaped in most localities, but raspberries suffered both by the shoots being killed back and by the canes being frozen. The latter is probably partly the result of winter conditions. Grapes do not seem to have suffered injury, so far as I can learn. (Anderson, June 9)

Nebraska: Grapes promise 50-75% of a crop; gooseberries and currants 10-20%. (Howard, May 17)

Utah: The apricot crop, which is of very little importance in Utah, is light. (O'Gara, May 16)

APPLE

Scab caused by *Venturia inaequalis*

According to reports of field men of the New York State College of Agriculture, apple scab is prevalent in unsprayed or improperly sprayed orchards in that state. Many orchards which usually receive good care were not well sprayed this year, probably because of both unfavorable weather at the proper time for application and lack of interest in the reduced crop resulting from frost injury. Mature ascospores were first observed about April 6 in Onondaga County and April 18 in Wayne County. Rains in April and May favored the development of the fungus. Most reports state that the disease is practically absent from orchards sprayed according to Farm Bureau recommendations. Abundant secondary infections were noted May 20 in an Orleans County orchard which had been dusted.

Scab has become so prevalent in parts of Ohio, according to reports from Selby and Clayton, that the Botany Department of the State University has sent out notices warning growers of the necessity of protecting the trees from serious defoliation. The disease was first noticed in the southern part of the state on April 25, and is now serious in southern, western, central, and north-central Ohio, and probably occurs throughout the state.

In Virginia, discharge of ascospores was noted by Fromme on March 25. In West Virginia the disease was first observed on April 25, but weather conditions were said to be not especially favorable for infection at that time. Scab has also been reported locally from Connecticut and Indiana.

FIELD AND VEGETABLE CROPS

POTATO

Potato germination troubles

An unusual number of missing hills was reported in April in early potato fields in the Norfolk and Eastern Shore section of Virginia and the eastern part of North Carolina. In some cases the stand was reduced from 50-75% and the fields were plowed up and replanted. The average reduction in stand in Virginia, however, was not more than 20%, according to Fromme, while in North Carolina the probable reduction in the crop of affected fields was estimated at 50% by W. B. Mabee, Extension Entomologist.

The trouble was found to be caused by complete or partial destruction of the seed-piece by the seed-corn maggot or various fungi, especially Fusarium sp., or both together. In some cases it was difficult to distinguish the original cause of the injury. The serious nature of the damage was accounted for by the unusual weather conditions prevailing during and shortly after the planting season. Regarding this, Fromme Says (April 11):

> "Air temperatures during February and March have been unusually high and precipitation has been unusually low. This combination of high air temperature and low soil moisture no doubt caused unusually high soil temperatures during, and immediately following, the planting season..... There is considerable difference between fields planted on different dates, the early plantings being the worst. The rotting is most prevalent on high ground and on the lighter soils. The better stands in severely infected fields are found on the lower ground."

Mr. M. Shapovalov, who visited the Norfolk section April 11-17, reported concerning the same condition as follows:

> "The ascertaining of the immediate causes of the germination trouble now prevalent in some parts of the country at once raises the question as to why the fungus rot as well as the maggot injury are so extremely serious this year. In this respect observations point out to a correlation between the degree of damage and the weather conditions immediately following the planting. The month of March, when most of the planting was done, was exceptionally warm and dry. This is particularly true with regard to the first part of the month. The thermometer was then in the neighborhood of 90° on several days and there was only a fraction of an inch of rainfall. It is therefore quite significant that nearly the entire amount of the seed piece injury falls on the crops planted during this period. Those planted later showed good stands. Since high temperatures favor the development of various parasitic fungi such as Fusarium oxysporum, the above mentioned

coincidence is quite clear. The low precipitation, on the other hand, might have been unfavorable to the normal activities of the potato plant, retarding its germination and growth and thus indirectly weakening its resistance to invasion. The apparently detrimental effect of high soil temperature and its low moisture contents on the condition of the potato seed pieces is further demonstrated by the fact that in the same field most of the damage was confined to elevated spots with light sandy soil while in lower places it was much less significant and sometimes entirely absent. These low places of fields are usually moist and cooler. Such a situation is quite analgous to that existing sometimes in irrigated sections of the West. It has been noted there that fields or parts of fields which receive plenty of water during the hottest summer period can withstand the wilt attack better than those which are kept relatively dry."

From reports of field men of the New York State College of Agriculture, it appears that germination trouble is prevalent in parts of New York also, particularly in Nassau County on Long Island and in Genesee and Orleans Counties. Rotting of the sprouts by Rhizoctonia is apparently the chief cause of the damage in that state, although seed-piece rot caused by other organisms, and inferior seed due to poor winter storage which lowered the vitality of the tubers, as well as to inherently poor quality of the tuber itself, are important contributing factors. Rhizoctonia has been commonly reported in stock raised from seed which was treated last year.

In response to the special memorandum concerning these troubles which was sent from this Office, April 29, J. J. Taubenhaus reports a similar condition in Texas, as follows (May 4):

"In Texas, this year, we have a condition which is no less serious than that in Virginia and North Carolina. We had practically the same weather conditions as they had in Virginia. Furthermore, during the last six weeks our rainfall precipitation was abnormally high for this time of the year. This condition resulted in practically ruining over 60% of our potato crop. All potatoes grown on flat lands, especially heavy lands, are a total failure. I have personally examined many instances where potatoes have recently rotted and the cause of the trouble is, undoubtedly, a Fusarium in combination with bacterial soft rot (slimy soft rot). I have as yet received no report from eastern Texas."

TOBACCO

Downy mildew, a new disease caused by *Peronospora* sp.

On April 22 a memorandum was sent from this Office to collaborators in tobacco states calling their attention to a destructive new disease of tobacco, which appeared in March in the cigar-wrapper (Gadsden-Decatur) section of Florida and Georgia. So far as is known at the present time it is confined to this region.

The disease was investigated by Mr. R. E. B. McKenney of this Department, who visited the affected localities. The outbreak was extremely serious in seed-beds, spreading very rapidly, and was also found in fields where the plants had been set out under shade. Hot dry weather in the early part of May, however, checked the ravages of the disease, so that the loss from it, if present conditions continue, will not exceed 5%.

A Department Circular by E. F. Smith and R. E. B. McKenney has been issued, containing suggestions as to the control of the disease. Among methods recommended are:

> Thorough sanitation and sterilization of seed-beds, including soil, frame, and cover.
>
> Use of seed from disease-free plants.
>
> Removal of diseased leaves in tobacco fields, and spraying with bordeaux, not stronger than 2-2-50.

The disease has been found occurring naturally on a white-flowered tobacco in a garden. It is thought likely that other solanaceous plants may also be attacked, which would complicate the problem of effective control.

Wildfire caused by Bacterium tabacum

Wildfire is said to be causing considerable damage in seed-beds in Massachusetts, Connecticut, and Kentucky, and according to E. E. Clayton, occurs in a few places in Brown and Clermont Counties in Ohio. The disease is also reported by the Bureau of Crop Estimates from Tennessee.

Massachusetts: Practically the same condition as reported by Dr. Clinton is found in this state, although I do not think the disease has become quite so serious here. It appears to be spreading, however, and should weather conditions favorable to wildfire prevail after the plants are set in the field, I fear the result may be disastrous. (Osmun, May 14)

Connecticut: Wildfire has broken out in the seed-beds of Connecticut in a number of places and seems to be very destructive to the small plants, forming a wet rot of the leaves an inch or so in diameter, which rapidly die from the tip inward. A week or ten days later on the larger plants with leaves a couple of inches in length, the characteristic yellow halo spots are evident forming away from the margins of the leaves, and apparently developing slower. This disease first appeared in a bed in which the seed and soil were both sterilized. Apparently flea beetles are active in spreading it. (Clinton, May 10)

Kentucky: Wildfire disease has broken out seriously again in our seed-beds in several sections of the state. (Valleau, April 25)

The wildfire and angular leaf spot have broken out in practically all sections of Kentucky in the seed-beds. The disease is particularly severe throughout the Burley section where practically every bed is badly diseased. In the dark section in the southwestern part of the state the injury is not so serious as in this section, as the plant beds are much earlier and the weather conditions have not been so favorable for the spread of the disease. A considerable amount of tobacco has already been set in the field, some of it from diseased beds and others from beds which appear to be free. You may look for a considerable amount of trouble throughout this section of the country

with these diseases during the coming summer. (Valleau, May 16)

Angular-spot caused by Bacterium angulatum

Angular-spot has been reported to date from Kentucky only, where it is doing some damage in conjunction with wildfire, as indicated in the report of May 16 given under that disease.

THE PLANT DISEASE BULLETIN

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Volume V Number 2

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

Vol. V. July 15, 1921. Number 2.

Leaf rust of wheat unusually abundant this year. (Page 24)

A Fusarium root-rot of wheat reported by W. W. Mackie as serious in certain localities of California. (Page 27)

"Whiteheads" of wheat, barley, and rye associated with a root rot of some kind was the cause of loss in Oklahoma. (Pages 27, 28, and 29)

Leptosphaeria on California wheat has been determined by A. G. Johnson. The fungus seems to be producing a disease of economic importance. (Page 27)

Head smut of rye collected for the first time in New York. (Page 28)

An apparently new and undetermined root rot of rye observed by H. S. Jackosn in Indiana. (Page 28)

Apple blotch reported as gradually progressing northward in Ohio. (Page 29)

Bacterial spot of peach abundant again this year in Indiana. (Page 32)

Dr. James Johnson, of the Experiment Station at Madison, Wisconsin would like specimens and reports of tobacco diseases from any or all parts of the country. Collaborators and others are asked to do what they can in the way of securing data on diseases of this crop and reporting the same to this Office or to Dr. Johnson.

CEREALS

WHEAT

Bunt caused by Tilletia laevis and T. tritici.

No reports have been received of more than very slight damage caused by bunt, although in Oklahoma the disease was said to be serious in fields where it occurred, as much as 30% infection having been observed.

A report received from E. C. Stakman and W. N. Christopher indicate general and severe infection of bunt in the vicinity of Saltillo, State of Coahuila, Mexico. The reduction in yield was estimated as ranging up to 25%.

Loose smut caused by Ustilago tritici.

It is difficult to tell, from the few reports at hand, how loose smut compares in prevalence with average years. H. S. Jackson thinks it is more abundant than usual in Indiana and R. C. Thomas found it in quantity in parts of Ohio. R. S. Kirby, who has been examining many wheat fields in New York, states that this disease is very common and some fields are found with high percentages (10-15%). In Mexico, Stakman and Christopher reported general but slight infections in the vicinity of Saltillo.

Indiana: Loose smut is more abundant, generally speaking, than usual when the whole state is taken into consideration. In this connection it has been interesting to note that wheat treated with hot water in 1919, while it gave a clean crop in 1920, is showing an abundance of smut this year, indicating that under favorable conditions for infection smut may increase very rapidly in treated wheat. It is practically impossible to get seed plots isolated and I am now inclined to think that smut may carry for some distance, especially in bright weather when there is a good breeze. I see no reason why this should not be true, though I do not believe we have very much data on how far the loose smut will spread. (Jackson, June 27).

Tennessee: Loose smut of wheat this season caused a very slight damage, about .25%, ranging from .05% to 1%. A possible explanation of such small damage is that the wet weather during the time of blooming of wheat last year might have prevented a serious infection with the smut. (Sherbakoff, June 15).

Ohio: In Darke County loose smut infections were very marked, especially in fields planted with the Goens variety. In two fields I found loose smut infection ranging from 9-16%. (Thomas, June 27).

General over state; of moderate importance, 0-8% of heads affected. First observed May 21, southern Ohio. (Clayton, June 15).

Stem rust caused by Puccinia graminis.

It is still too early to report on the damage stem rust will do to the spring wheat crop but as far as winter wheat is concerned the disease will not be an important factor in reducing yield except possibly in a few very limited localities. Reports received would indicate a smaller amount of stem rust than usual in winter wheat states.

Virginia: One case severe infection reported from Wythe County. Quite late in appearing at Blacksburg and found in only slight amounts. None seen in a number of fields in other sections which were inspected shortly after blooming period. (Fromme, July 1).

West Virginia: Quite severe in the southeastern part of the state. Mr. Berg found good evidence of its spread from sections where the barberry was found to sections some distance away. The disease was evidently less serious and in an earlier stage in the distant fields. (Giddings, July 1).

Kentucky: Appeared in the northern half of Kentucky about one to two weeks before harvest. No record of southern half of state. At the Experiment Station at Lexington it was in sufficient quantity to cause injury to certain pure lines. Ashland, a selection of Jersey Fultz, proved practically immune to black stem rust at Lexington, while other strains in the same field were severely rusted. (Valleau, July 1).

Tennessee: (Observations made during April, May, and June in the vicinity of Knoxville, Murfreesboro, Columbia, Nashville, Jackson, and Union City.) Stem rust in many fields could not be found at all, even in the latter part of May and early in June, that is, shortly before harvest time this year. Usually an occasional plant affected with the rust could be found, especially on the border plants that yet remained green. Only in one field, on the farm of the Normal School at Murfreesboro, the rust was found, June 4, in a severe form in a low part of one field. The rest of the field, in the higher part of it, was nearing full maturity and was practically free from the rust. The wheat specimens brought in by the Knox County Agent, and his information in regard to other fields, showed that some fields in East Tennessee were seriously injured by the rust, the damage in some exceptional fields being as high as 30%. The damage for the State would be considered at about 3%. (Sherbakoff, June 15).

Arkansas: More than usual, probably little damage. (Elliott, July 1).

Ohio: The counties of Coshocton, Muskingum, Ross, Pickaway, Darke, and Van Wert were visited. I was surprised to note the serious loss due to black stem rust in Ross County. While infection was general throughout the county, severity of losses was somewhat localized. In some three or four fields I estimated the loss at 25% due to the black stem rust alone. (Thomas, June 27).

Indiana: There is at the present time a scattering of stem rust, though I have seen no serious outbreak. Barberries in some sections of the state were abundantly affected and I am leaving today for Lagrange County where I will look into that general situation with Mr. Hosmer. There are a large number of wild barberries in that section which were badly infected. (Jackson, June 27).

Illinois: Only in a few cases have we found the barberry heavily rusted, but it is of interest to note that the rust is becoming heavier on the barberry as our work approaches the shores of Lake Michigan. (L. R. Tehon, Cereal Courier 13: 96. June 10).

Michigan: The most severe infections of barberry bushes in Michigan have been found this year. (W. F. Reddy, Cereal Courier 13: 97. June 10).

Wisconsin: Every barberry found this month showed rust more or less abundantly, but only one instance of stem rust on a grain was discovered. That was at Trempealeau on May 30. (Neol F. Thompson, Cereal Courier 13: 98. June 10).

Minnesota: The search for stem rust has been carried on extensively. Rust on common barberry was reported for the first time on April 25 from Jackson County and, on the following day, was found in Watonwan County. No uredinial infections have been found in the field by the scouts in Minnesota. (Leonard W. Melander, Cereal Courier 13: 85. May 20).

South Dakota: Black rust made its appearance on the Brookings station for the first time last Thursday. A close observation from day to day had not revealed it before that time. It was found on Kharkoff wheat and was not found on any other wheat. Thus far it has not appeared on any other wheat. This is in part due probably to the fact that the season has been very dry here for the past two or three weeks. (Arthur T. Evans, June 28).

I have just returned from a trip west of the river. I did not find a trace of rust in the regions in which I visited. I was surprised to find that there was no rust even as near to Brookings as Highmore. (Arthur T. Evans, July 2).

During the month of May we have found the rust on barberries developing quite generally in moderate amounts, wherever we have found barberries. In one or two instances very severe infection was found. The first aecia were found on May 5 at Flandreau, and the first mature aecia on May 13. Since that time only matured infection has been found. We have watched carefully for the red stage of the disease on grains and grasses, but as yet have been unable to find it. (H. C. Gilbert, Cereal Courier 13: 102. June 10.).

Colorado: The first infections on barberry in this state were found at Longmont, May 31. On June 3, infection was found north of Fort Collins, Some rust on grains has been reported in the northeastern part of the state near Sterling. (John R. Fitzimmons, Cereal Courier 13: 100. June 10.).

Leaf rust caused by Puccinia triticina.

All reports concerning leaf rust indicate that it has been much more important than usual this year. Reports from Delaware, Arkansas, Indiana, and South Dakota indicate that the disease is severe in those states. Leaf rust is said by E. C. Stakman and W. N. Christopher to be fairly prevalent but not destructive in the vicinity of Saltillo and Piedras Negras, Coahuila, Mexico.

According to A. F. Swanson (Cereal Courier, June 20, page 113) Kanred wheat shows marked resistance to leaf rust. Kanred and Blackhull Turkey varieties are said to be resistant in Oklahoma, having usually about 10% infection as compared with 40-65% for other varieties.

New York: Leaf rust is very bad in many fields. It is particularly so on station grounds and in some other places that I have visited. (H. H. Love, (Ithaca) Cereal Courier 13: 111. June 20.)

Delaware: First reported this season April 8. Considerable infection was found on young plants as late as December last year. Has been very severe this season. Fields appeared prematurely ripening as result of severe leaf infection. Infection on glumes common and many fruits found with sori at crown. (Manns, July 1.).

Virginia: More epidemic than I have ever observed it before. Especially severe on early sown wheat. This injury combined with that caused by late frosts probably caused greater reduction in yield than any other single agency. (Fromme, July 1).

West Virginia: The disease was unusually destructive in the southern Ohio valley and certainly caused considerable loss there. We have evidence from growers, county agents, specimens submitted, and a personal visit to the section by Mr. Berg. (Giddings, July 1).

Ohio: General over state, serious in spots. First observed May 26 in southern Ohio. (Clayton, June 15.).

Illinois: The men engaged on flag smut survey in the bottom lands of the

Mississippi River during May and June found leaf rust very abundant and according to growers it was much more serious than usual. In many fields the wheat kernels were slightly shriveled and the heads were not entirely filled. Leaf rust may have been partially, but probably not wholly responsible for this condition. (Haskell, June 28).

Indiana: Leaf rust has been very severe, more so I think than any year I have been in Indiana. It is practically universally present, so much so as to be commented on in the papers, and has attracted a good deal of attention. Opinions differ as to the loss and it is of course very difficult to get at anything tangible in this connection. I am convinced, however, that there has been considerable loss from the leaf rust this year, particularly where the infection occurred early. (Jackson, June 27).

Arkansas: Apparently less than usual, but in some parts of the state the wheat was entirely destroyed by this rust. (Elliott, July 1).

South Dakota: Leaf rust is very abundant. In many cases it is doing serious injury to the grain I feel sure. On many of our plots every leaf is dead yet the grain seems to be filling rather well. I can't conceive, however, of its filling entirely without shriveling under these conditions. (Evans, June 28).

Nebraska: Abundance of rain has resulted in a heavy development of orange leaf rust. (Bureau of Crop Estimates Crop Notes, week ending June 11.).

Scab caused by *Fusarium* sp.

Scab is less prevalent than usual this year, according to reports received, although in parts of West Virginia and Ohio rather heavy infections were observed. In Virginia and Tennessee dry weather at the time of blooming was mentioned as a probable cause of the unusually slight damage.

Virginia: Occurred only in very slight amounts this year. There were very few rains during blooming period. (Fromme, July 1).

West Virginia: Scab is possibly a trifle more destructive than last year but far less injurious than in 1918-19. (Giddings, July 1).

During my recent survey for cereal diseases I included the counties of Pocahontas, Greenbrier, Summers, Wood, Marion, and Mason. In Pocahontas County the wheat was just coming into bloom and I could obtain no scab data. In Greenbrier County I found scab well distributed, infection showing from a trace to as high as 10%. In Summers County scab infection is generally distributed and rather severe. In one field an infection of at least 20% was observed - the damage to the head varying from infection in one spikelet to practically the whole head being destroyed. In Wood County I found only traces of scab on the hill farms, but on the bottom farms, scab infection was considerably higher. In Marion County few fields were seen but indications are practically similar to those in Wood County. In Mason a very general infection of scab was found, averaging about 5%. (Sherwood, June 24).

Tennessee: (Observations made during April, May, and June in the vicinity of Knoxville, Murfreesboro, Columbia, Nashville, Jackson, and Union City). Wheat scab infection was extremely small, in most of the fields only occasional specimens, and then not very conspicuous, could be found. No field was observed that was affected with the disease to any serious extent. Extremely dry weather during the time of blooming and during maturity of the wheat is the probable explanation of the low infection with the scab. (Sherbakoff, June 15).

Ohio: General in southern Ohio; of slight importance - 1-3% of heads affected. First observed June 6 in southeast Ohio. (Clayton, June 15).

The counties of Coshocton, Muskingum, Ross, Pickaway, Darke, and Van Wert were visited. I was somewhat surprised to find disease conditions so serious in Ross County. Wheat fields in the overflow lands of the valleys were all badly infected with wheat scab. In some cases infection was 15%. It was interesting also to note that in general throughout Ross County the rotation corn, wheat, and clover was quite universally followed. The same general situation prevailed in southern Pickaway, such as I had opportunity to investigate. Farther north in Van Wert County scab is very much less noticeable. I am quite positive that wherever I investigated fields where a longer rotation is employed, namely; corn, oats, wheat, and clover, or corn, oats, tobacco, wheat, and clover, also where some other legume, such as alfalfa, soy beans, or sweet clover is introduced into the rotation, scab infections were very much lower. (Thomas, June 27).

Indiana: Scab is present in small percentages in nearly all fields, but it is not doing as much damage as usual, possibly about the same as last year. There is some evidence of anthracnose, particularly on rye, though I have not seen very much on wheat. (Jackson) June 27).

Iowa: Spring wheat considerably affected by red rust and scab. (National Weather and Crop Bulletin, week ending June 28).

South Dakota: Wheat scab is here in slight quantities. (Evans, June 28).

Anthracnose caused by Colletotrichum cereale.

Anthracnose of wheat has been reported from Virginia, Tennessee, and Indiana. The damage is said to be slight, although in one field in Brunswick County, Virginia the disease was causing falling of the plants in well defined spots 2-4 feet in diameter.

Glume blotch and leaf spot caused by Septoria spp.

Infection with one or both of the Septoria diseases is rather general in most states reporting their presence. In Virginia and Arkansas the glume blotch is reported as causing serious damage, in some localities at least. Both the leaf spot and glume blotch occurred in West Virginia and Tennessee. In the latter state both diseases were common, but the glume blotch was thought to be the more important. Septoria sp. was reported from North Carolina where it was said to be common but not causing much damage, and from California where it caused damage to early wheat in the Sacramento Valley as early as March.

Virginia: General in fields near Chatham, Pittsylvania County, on heads, leaves, and stems. Some plants were stunted and deformed. Infection of rachis on some heads produced a condition resembling Fusarium blight. Seemed to have caused considerable reduction in yield in worstfields. (Fromme, July 1).

West Virginia: In Summers County in several low-lying fields the Septoria glume blotch and leaf blotch are very common. In Mason County Septoria glume blotch is very general. (Sherwood, June 24).

Tennessee: (Observations made during April, May, and June in the vicinity of Knoxville, Murfreesboro, Columbia, Nashville, Jackson, and Union City.) Glume blotch was common in most of the wheat fields examined at the end

of May and early in June, the number of the heads affected varying from a trace to about 30%, with the average about 2%. How much damage had been done by the disease we hope to determine, at least approximately, by comparative weight of grain from diseased and healthy heads at the time of threshing the wheat. (Sherbakoff, June 15).

Arkansas: Common and apparently rather severe. (Elliott, July 1).

Powdery mildew caused by *Erysiphe graminis*.

Powdery mildew has been reported from Delaware and West Virginia. In the former state it was said to be associated with considerable yellowing but not seriously affecting growth.

Disease caused by *Leptosphaeria* sp.

Leptosphaeria sp. has been identified by A. G. Johnson on wheat from the Plant Introduction Garden at Chico and elsewhere in California. According to W. W. Mackie this disease is common in the Sacramento Valley, this year and causes as much as 15 or 20% loss in some fields. The disease may cause the death of the plants, reduce the number of tillers, or induce premature ripening with consequent loss of crop.

Root rots caused by various organisms.

A *Fusarium* root-rot was reported from California by W. W. Mackie, who found the disease to be causing more or less damage in nearly all the wheat and barley fields visited south of Davis. In some instances the reduction in yield was estimated at 20-25%, but it was usually about 5% or less. Symptoms of the disease were weakened culms, death or early maturity of the plants, pink discolorations of roots and culms, and shriveled kernels.

"Whiteheads", a disease of wheat, barley, and rye, which seems to be due to a serious undetermined root-rot similar in its effects to the so-called take-all, is reported by Robert Stratton as very common in Oklahoma, being present in varying amounts in many fields, and causing losses ranging from a trace to over 20%, averaging about 2%. The disease usually occurs in spots which are apparently associated with manure and are largest in fields where the wheat was pastured, and is said to become more serious each year in fields continuously planted to wheat. In many, but not all, of the spots a joint worm was found apparently contributing to the injury. In many cases the entire head of grain was destroyed.

A root rot of wheat has been reported from two places in Idaho and is being investigated by C. W. Hungerford. No details are available at this time.

A considerable amount of root-rot of wheat and barley, apparently due to *Helminthosporium* sp. and *Fusarium* sp. was found in several counties in Minnesota by J. J. Christensen.

RYE

Stem rust caused by *Puccinia graminis*.

No reports of stem rust of rye have been received.

Leaf rust caused by Puccinia dispersa.

Leaf rust has been reported only from Virginia, where it was said to be more common than usual but apparently not destructive, and from Missouri, where it occurred on the Station plats at Columbia.

Anthracnose caused by Colletotrichum cereale.

Anthracnose was reported by J. B. Kendrick as causing a serious crown-rot of rye in several fields in Porter County, especially in one 50-acre field of Rosen rye where it had killed from 40-60% of the plants. In other fields from 8-10% of the rye was dead. The stalks were dead at the crown and infection of the heads was common.

Head smut caused by Ustilago sp.

Three heads of this smut were collected on volunteer rye in a wheat field near Ithaca, New York on July 6 by R. J. Haskell and R. S. Kirby. A later and more careful inspection of the field by Kirby, Fitzpatrick, and Welch revealed twelve diseased plants with twenty infected heads. This is the first report of head smut of rye for New York.

Ergot caused by Claviceps purpurea.

Ergot has been reported only from Ohio where it is of general occurrence but slight importance. It was first observed June 10 in the southern part of the state.

Root-rot, cause undetermined.

An undetermined root-rot, apparently new, was observed by H. S. Jackson during June in Starke County, Indiana. The disease appeared in large patches and caused the death of the plants shortly after heading out. Although the effects of the disease resembled those of severe infection with anthracnose, that fungus was not found. There was no evidence of any fruiting bodies of any causal fungus. The trouble deserves further investigation.

The disease known as "whiteheads" which was reported on wheat from Oklahoma, occurs on rye also, according to Robert Stratton.

BARLEY

Scald caused by Rhynchosporium graminicola.

Barley scald was prevalent during March in early and volunteer fields in California, according to W. W. Mackie, but was later checked by drought and while early fields were severely injured late sown fields escaped with much less damage. Tennessee Winter barley is said to be resistant to scald in California.

Root-rots caused by various fungi.

In Minnesota a root-rot of wheat and barley which was apparently caused by Helminthosporium sp. and Fusarium sp. was found by J. J. Christensen in several counties.

"Whiteheads", a disease of wheat, rye, and barley, was reported from Oklahoma by Robert Stratton. (See wheat).

A Fusarium root-rot of wheat and barley which occurred in California is reported under wheat.

APPLE

Scab caused by Venturia inaequalis.

Scab is said to be prevalent and rather serious in Arkansas, Indiana, and Kansas on the foliage and in northern Idaho on both fruit and leaves, as well as in parts of New York and Ohio, as indicated in the preceding issue of this Bulletin. In Arkansas and Indiana favorable weather and failure of growers to spray resulted in particularly severe infection. In New Jersey the disease is said to be very abundant in some orchards. In West Virginia, although generally distributed, it is not so severe as last year according to Giddings, and both spraying and dusting have given satisfactory control. Only slight infection is reported from Nebraska. Very little of this disease had been noted during the past two years in Idaho, but this year Hungerford reports it to be very abundant in unsprayed orchards in the northern part of the state.

Blotch caused by Phyllosticta solitaria.

Blotch is said to be severe in Arkansas in sections where apples are grown for the local markets. It is also reported from Ohio, where it is serious on susceptible varieties having fruit. Specimens have been collected in Pike, Lawrence, and Franklin Counties, which are north of the usual range of the disease in Ohio. It was first observed in the southwestern part of the state on June 13.

Fire blight caused by Bacillus amylovorus.

Fire blight is said to be common in Kentucky and southeastern Indiana; less important than usual in Arkansas, Ohio, and Kansas; and negligible in West Virginia, Louisiana, and Nebraska. Some local injury is caused by it in West Virginia and Ohio, particularly as blossom blight in the latter state, although the twig blight is more general. In New York also, according to reports of field men of the State College of Agriculture, it is locally serious, especially in young orchards, in Genesee County and in New Jersey it is said to be very abundant on some varieties. Reports of the Bureau of Crop Estimates indicate that it is causing some damage in South Carolina and Wisconsin.

The spring frosts, which killed pear blossoms and limited the sources of infection, are thought to be largely responsible for the reduced amount of the disease on apples as well as pears in Ohio this year.

The varieties King, York, and Imperial were reported from Genesee County, New York as seemingly very susceptible to fire-blight.

West Virginia: Fire blight injury is practically negligible in the state as a whole, but has caused some injury locally and particularly in towns.

Ohio: We are able to report again as to reduced fire blight infection upon apple in Ohio for 1921. The freezing appears to have limited sources of infection by killing pear fruits in bloom. "Blossom" infection is locally severe though decidedly restricted. "Twig" infection is rather slight though quite general on susceptible varieties. Very severe blossom infection studied in Trumbull County by a visit in June, presented a problem of control by spraying to kill red bug and leaf hopper through application of nicotine sulphate in spray of weaker Bordeaux since number of spurs to be removed was without reasonable limit. Similar infection was reported from localities in adjacent counties. Outcome of the spraying is yet to be studied. (Selby, July 1).

Blister canker caused by Nummularia discreta.

Blister canker has been reported from Ulster County, New York, where it was abundant in several Ben Davis orchards on April 25; and from Ohio, where it is increasing in severity on older trees, especially in the southern part of the state. Removal of infected branches before the buds swell is recommended as a control measure by Selby in Ohio.

Black rot caused by Sphaeropsis malorum.

The frog-eye leafspot has been reported from Connecticut, New York, West Virginia, Ohio, and Indiana. In New York, West Virginia, and Indiana it is said to be prevalent on unsprayed trees, causing defoliation in some orchards.

Calyx-end rot has been reported from Indiana.

Cedar rust caused by Gymnosporangium juniperi-virginianae.

No reports on cedar rust have been received from Virginia as yet but those from other states indicate that it is causing little damage except locally in New York and West Virginia. It has, thus far , been reported from Connecticut, New York, Maryland, West Virginia, and Ohio. In West Virginia, although conditions were particularly favorable to heavy rust infection, the disease is causing practically no injury in commercial sections, due probably to the eradication of cedars. In the southeastern part of the state, however, it is said that the amount of rust has increased noticeably during the past few years.

At Leland, Maryland, the first telial horns were observed during the rainy period of April 23. The disease was first noticed in West Virginia about April 25; in Ohio on June 6, in the southeastern portion.

PEAR

Fire blight caused by Bacillus amylovorus.

Blight has been reported from New York, South Carolina, Georgia, Ohio, and

Arizona. In New York, according to reports of field men of the State College of Agriculture, it is locally rather severe in several counties, and in Ulster County it is said to be abundant in most orchards. In Ohio it was first observed May 25, in the southern part of the state, and is now general and quite serious, according to Clayton. Twig blight was reported as serious at Winkleman, Arizona, on June 3, but the disease has not been recorded from other localities in that state as yet.

PEACH

Brown rot caused by Sclerotinia cinerea.

Reports of brown rot from New York, Tennessee, South Carolina, Texas, and Indiana, are given below.

No field reports of brown rot have been received from Georgia but inspectors of the Bureau of Markets found the disease in 131 cars of Georgia peaches inspected at destination during May and June. The average amount was about 13%.

New York: April 18 - Wayne County - Brown rot mummies in shape to discharge spores during rainy periods.

April 25 - Orleans County - Brown rot shows considerable activity in peach orchards.

Ulster County - No brown rot infections observed to date.

May 16 - Orleans County - Twig blight rather serious on peaches from blossom infection.

Ulster County - Some old brown rot blossom blight has been observed.

May 23 - Orleans County - Twig blight serious in many orchards.

May 31 - Orleans County - Very marked results where pink spray applied for twig or blossom blight. Very little rot where applied.

June 13 - Wayne County - Showing up in some cases.

July 11 - Ulster County - Showing up considerably due to hot muggy weather of the past week. (New York State College of Agriculture Weekly News Letter.)

Tennessee: Brown rot has been relatively unimportant thus far. Blossom blight, which was so abundant in 1920 was reported from three counties only. Twig and leaf blight were reported from three counties. Cankers were reported from four counties. Complaints of severe damage have not thus far been made. (Hesler, June 9).

South Carolina: Damage to early peaches probably about 5%. Less severe than usual at present owing to the prevailing dry weather. There was a serious blossom infection in one or two localities. This is our worst peach disease. No system of treatment seems to have been devised which will give control in a year favorable to the disease. (Ludwig, July 1).

Texas: Very prevalent. Wet season. Five percent loss. (Taubenhaus, July 1).

Indiana: Considerable on what few peaches there are in the state. (Gardner, July 1).

Scab caused by Cladosporium carpophilum.

Scab is said to be prevalent in Texas and causing a loss which will probably amount to about 1%. In Indiana, according to Gardner, it is especially

severe on twigs of southern grown nursery stock. No other reports of damage due to scab have been received.

Leaf curl caused by Exoascus deformans.

Leaf curl is apparently less important this year than last, although in New York and Indiana it is said to be severe in unsprayed orchards, or those sprayed too late. In Tennessee the reduced prevalence of leaf curl is thought to be due to dry weather at the opening of the buds. The disease has also been reported from Connecticut, South Carolina, Texas, Ohio, Michigan, Nebraska, and Kansas, in slight amounts.

Tennessee: Curl was very much less prevalent than in 1920, owing to the dry weather at the opening of buds. A survey of 18 counties shows that while there were traces of the disease present, practically no damage was done. (Hesler, June 9).

Ohio: While the infection is recognized to be widespread, attacks are less serious this year than normal. Excellent control has been noted in orchards sprayed with the dormant spray. (Thomas, July 1).

Indiana: Very destructive and prevalent on unsprayed trees. Not as bad as in 1920. (Gardner, July 1).

Black spot caused by Bacterium pruni.

Severe damage due to black spot is reported from Indiana, in the vicinity of Vincennes, and in Texas also the disease is prevalent and is causing some loss. Black spot is thought to be much less general in Ohio than was the case last year. It occurs in South Carolina but is causing only slight injury, according to Ludwig.

Ohio: Black spot has been noted in some orchards but seems to be somewhat localized. The general widespread infections such as occurred last season are not found this year. It is thought that the presence of the disease is far less than normal. (Thomas, July 1).

Indiana: Extremely severe in many orchards about Vincennes. Limiting factor in that region. Caused conspicuous blighting of 1921 twigs in May. Already has caused extensive defoliation and spotting of fruit. (Gardner, July 1).

Gummosis (cause undetermined).

A gummosis of unknown cause, apparently physiological, is reported from Ohio as follows:

> "Many reports have come to our attention accompanied by specimens of a peculiar gummosis trouble found in many peach orchards. Repeated attempts at isolation of the organism have been unsuccessful. It is thought to be a physiological condition."

Rosette (cause unknown).

The following report of rosette has been received from South Carolina:

"Trees showing symptoms similar to those described by Dr. E. F. Smith some years ago and attributed to rosette have appeared in a few orchards."

STRAWBERRY

Leaf spot caused by Mycosphaerella fragariae.

Mycosphaerella leaf spot seems to be causing little injury this year in most states.

New Hampshire: Present in most fields but owing to dry weather not as abundant as usual. (Butler, July 1).
New Jersey: Common and apparently destructive in some cases. (Cook, July 1).
Delaware: Very prevalent in fields not sprayed. Where beds are dusted or sprayed good control of leaf spot is secured. (Manns, July 1).
West Virginia: Observed in eastern and northern part of the state, but not destructive. (Giddings, July 1).
South Carolina: Present. Damage slight. (Ludwig, July 1).
Louisiana: More or less common but causing but little loss except on susceptible varieties. The Klondyke, which is largely grown in this state, shows considerable resistance. (Edgerton, July 1).
Texas: Traces. Unimportant, this year. (Taubenhaus, July 1).
Ohio: In old patches this disease has been found to be severe even in recent plantings. The leaf spot is the only strawberry disease which demands attention this year. Where spraying is practiced as a means of control, excellent results are obtained. (Thomas, July 1).
Indiana: Generally prevalent this year. (Gardner, July 1).
Nebraska: Slight amount of infection. (Goss, July 1).
Kansas: Not very common. Not doing any damage. (Melchers, July 1).
Colorado: No report has been received regarding this disease. I have noticed it in some of the gardens about Fort Collins, but in no instance causing any damage. (Learn, July 1).
Arizona: Reported as yet only from Jerome Junction, Yavapai County. Very dry year. (Brown, June).
Idaho: Some noted - not serious. (Hungerford, July 1).

Gray mold rot caused by Botrytis sp.

Gray mold rot has been reported only from Delaware, where it is said to be common and causing losses of 2-3%; and from Louisiana, where it is not serious, although common.

Rhizopus rot caused by Rhizopus nigricans.

This disease is said to be common in Delaware on overripe fields, causing losses of 5-10%; common but not serious in Louisiana; and prevalent in the field in Texas due to the wet season.

Leaf scorch caused by Mollisia earliana (Marssonia potentillae fragariae)

The following report of leaf scorch has been received from Louisiana:

"Very common and apparently causing more loss than the regular leaf spot."

Fruit rot caused by Patellina fragariae.

This fruit rot was reported from Louisiana as follows:

"Very common and causing some loss. The loss from all the fruit rots has been less than 10%"

FIELD AND VEGETABLE CROPS

BEAN

Bacterial blight caused by Bacterium phaseoli.

New Jersey: Present. Not severe. (Cook, July 1).
Virginia: Reported from Pulaski and Orange Counties and also found in slight amounts at Blacksburg. (Fromme, July 1).
Texas: Considerable blight, especially on late planting. Ten per cent loss. (Taubenhaus, July 1).

Anthracnose caused by Colletotrichum lindemuthianum.

Anthracnose has been reported from New Hampshire, New Jersey, West Virginia, South Carolina, and Texas, in all cases as of slight importance.

New Hampshire: Present in fields but dry weather has prevented any material development. (Butler, July 1).
Virginia: None observed to date, but no doubt present. (Fromme, July 1).
West Virginia: Reported from several sections as injuring the young plants. I believe, however, that it is being confused with the stem rot, although there was quite a little anthracnose on cotyledon leaves in gardens around here. (Giddings, July 1).
Texas: Traces. Unimportant since the beans were picked early before the wet season struck them. (Taubenhaus, July 1).

Mosaic (cause undetermined).

Arkansas: Some mosaic has been observed. (Elliott, July 1).
California: Showing up on Lady Washington and Red Mexican, and Kentucky Wonder varieties, severe in all cases. Mostly southern California. (Milbrath, July 1).

Stem rots caused by various organisms.

Fusarium stem rots have been reported from West Virginia and California; and stem rot caused by Rhizoctonia sp. from Texas.

West Virginia: Reported as quite destructive in many gardens in the northern part of the state. Specimens submitted were quite typical of the Fusarium rot described by Burkholder. (Giddings, July 1).
Texas: Serious. Three per cent loss. (Taubenhaus, July 1).
California: In Los Angeles County very severe on Lima and large white varieties. Some acreages plowed under. Fusarium appears to be the cause. Old bean land largely attacked. (Milbrath, July 1).

CABBAGE AND CAULIFLOWER

Club root caused by Plasmodiophora brassicae.

Club root has so far been reported only from New Jersey and West Virginia.

New Jersey: Present and severe in some cases. (Cook, July 1).
West Virginia: Mr. Sherwood has just returned from a trip and reports a large amount of cabbage club root in some gardens in the northwestern part of the state. (Giddings, July 2).

Yellows caused by Fusarium conglutinans.

Yellows seems to be causing considerable damage where it occurs.

Virginia: First noted June 6 at Marion. Probably general as usual in southwestern part of state. (Fromme, July 1).
Kentucky: Considerable injury in fields at Louisville to early crop. Loss 30-60%. (Valleau, July 1).
Texas: Very prevalent. About 5% loss. (Taubenhaus, July 1).
Ohio: Very serious locally in central and southern Ohio. First observed June 9, central Ohio. (Clayton, June 15).
Arkansas: Very common. Our most severe cabbage disease. (Elliott, July 1).

Black leg caused by Phoma lingam.

Black leg is said to be common in Orange County, Virginia; common and severe in Arkansas; and is also reported from New Jersey.

Ring spot caused by Mycosphaerella brassicicola.

Ring spot was reported from California in April:

"The Colma district so-called includes Ingleside and Spring Valley in San Francisco County, and South San Francisco, Daly City, Millbrae, Colma, San Bruno in San Mateo County. Also trucks make hauls into Colma

from as far south as Half Moon Bay, a distance of 25 miles. The district is largely settled by Italians. Ring spot appears on cabbage, cauliflower, and broccoli and apparently with no difference in varieties affected. It has been prevalent for years and is attributed entirely to the weather. The amount of infection varies somewhat with the season. No control measures are practiced so far as I could determine. The heavily infected leaves are left in the fields which may account for the general dissemination of the disease and may also explain why the young plants seen about April 1 are so generally infected. My attention was called to the trouble along in January but probably it could have been observed as early as December 1 of last year. The reduction in yeild would be difficult even to estimate. The cold foggy days in this region undoubtedly favor the disease. The cold foggy weather is alternated with clear warm days." (W. S. Fields, April).

"Recently I made a trip through sections of the central portion of the state. In the cabbage and cauliflower section south of San Francisco, ring spot was found generally (100% severe infection). I saw broccoli fields which had been abandoned on account of injury by this disease." (Milbrath, April 15. New Notes of the Office of Cotton, Truck, and Forage Crop Disease Investigations, May 7: 5).

ONION

Downy mildew caused by *Peronospora schleideni*.

Downy mildew is said to be very prevalent and causing considerable damage to onions and shallots in Louisiana, the only state which has so far reported its occurrence.

Pink root caused by *Fusarium mallii*.

California: About 1000 acres in Delta region severely infected with result that total loss may result. (Milbrath, July 1).

Black mold caused by *Macrosporium parasiticum*.

Louisiana: Very common as usual on the seed onion. This disease together with the downy mildew has decreased the seed crop about 50%. (Edgerton, July 1)

TOBACCO

Dr. James Johnson, of the Agricultural Experiment Station at Madison, Wisconsin, is conducting a survey for tobacco diseases in the United States. Any assistance which collaborators and others can give will be appreciated. Notes and specimens may be sent to this office or directly to Dr. Johnson.

Wildfire caused by Bacterium tabacum.

The following report of July 5, from C. R. Orton, is the first of the presence of wildfire in Pennsylvania.

"Wildfire of tobacco has been located in Lancaster County, Pennsylvania. The infection appeared some weeks ago in the seed bed and since then a hurried but fairly comprehensive survey has been conducted in the county, and the disease found in six farms near Lititz. Later survey work is contemplated at about 'topping' time. This is the first report of this disease in Pennsylvania, I think, though one of the growers is certain that it occurred on his farm last year."

Two letters recently received by F. D. Fromme indicate the presence of wildfire, or a similar leaf disease, in southern Rhodesia and in Nyasaland, Central Africa; and a disease strongly resembling wildfire occurs in the Piet Retief District and the Rustenberg District in the Union of South Africa, according to a report in the Journal of the Department of Agriculture of the Union of South Africa, April, 1921. All of these reports state that the disease referred to causes considerable damage.

Wilt caused by Fusarium oxysporium nicotianae.

This disease was described by James Johnson in the Journal of Agricultural Research for January 3, 1921. It was found in 1916 near Benedict, and in 1917 near Newport, both in Charles County, Maryland, and in 1919 specimens were received from Owensville, Clermont County, Ohio.

Collaborators are asked to watch for the occurrence of Fusarium wilt in their states this year.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Contents

CEREAL AND FORAGE CROPS

WHEAT

Bunt caused by *Tilletia laevis* and *T. tritici*.

Ohio: This trouble has been conspicuous by its absence this year and few fields were found with more than a trace of stinking smut. (Clayton, July 15).

Indiana: Local; not as much as in previous years. (Jackson, July 15).

Nebraska: Slight general infection throughout the state. Heavier than last year. One county reports 20% infection. (Goss, July 15).

Kansas: Stinking smut or bunt is quite generally distributed over the state again this year and is serious in some of the Kanred fields sown with smutty untreated seed. (Parker, Cereal Courier 13: 125. July 10).

California: Bunt was found in spots where the seed wheat had not been treated, one field being found with 65% but as a rule the attack is reduced from that of last year. Seed treatment is more generally practiced. The average loss for the state may be given as 1.5%. (Mackie, July 1).

Loose smut caused by *Ustilago tritici*.

Two additional reports on loose smut have been received as follows:

Oklahoma: Loose smut of wheat has caused a loss of between 1 and 2%. (Stratton, June 27).

Ohio: The average for the state has been about 2% with certain varieties showing much more. For the pedigreed wheats the following are the averages secured over the state: Portage 5%, Gladden 2%, and Trumbull less than 1%. This would indicate that the Portage was susceptible to loose smut and that the Trumbull is very resistant. Of the common varieties Red Wave is probably the most susceptible to loose smut. Counts of 8-12% are common with this variety. (Clayton, July 15).

Stem rust caused by *Puccinia graminis*

Connecticut: No complaints. (Clinton, July 15).

New Jersey: Rare. (Cook, July 15).

West Virginia: A rather interesting feature was the distribution of black stem rust. In Pocahontas County the stem rust was very slight and mostly in the uredinial stage; increasing in severity as I traveled towards the barberry section in Monroe County. At the lower end of the county the infection was severe and in the black stage. (Berg, July 6).

South Carolina: Present, damage slight. (Ludwig, July 15).

Oklahoma: The black rust of wheat was not found to be very prevalent, but caused serious loss to one field near Oklahoma City. (Stratton, June 27).

Ohio: Stem rust appeared in Ohio about June 10. Subsequent to that date practically every field entered showed a sprinkling of stem rust, rarely enough to do damage, however. Stem rust did very severe damage in one section of Ohio, however, thus in Ross and Pike Counties many fields were ruined by this disease. The rust was locally severe elsewhere in the state. Many people made careful search for barberries near these areas where stem rust was severe, but all reported that they were unable to find any barberries. Question marks regarding the relationship of barberry to stem rust in Ohio are numerous this year. (Clayton, July 15).

Michigan: Southeastern Michigan: Monroe County, slight if any; Lenawee County, limited outbreaks; damage 5%. Southwestern Michigan: Very slight, except in direct relation to barberries, where reduction in yield was 40%. Northern and central parts of Lower Peninsula: Slight. Upper Peninsula: Severe. Loss in general 15%. (Coons, July 15).

Wisconsin: Widespread and doing considerable damage, especially to spring wheat. Less than 1920. (Vaughan, July 15).

North Dakota: Miss W. Weniger visited the station June 28. She found a few pustules of stem rust on some of the wheat varieties. Even now, however, only traces of stem rust can be found after a very careful search. There is practically no stem rust in evidence. (Brinsmade, Cereal Courier 13: 143. July 20).

Nebraska: Degree of infection on plants less than 5%. General infection throughout state. No damage. (Goss, July 15).

Rust infection on barberries in this section (Douglas, Sarpy, and Cass Counties) is very light. The spread of rust from barberries to cereals in this area was very difficult to determine. Most of the barberries found were near Omaha, and very few grains are raised in that vicinity. The grain fields were usually some distance from the bushes. Consequently, it was hard to tell whether the rust which did occur on grains came from the barberries or from some other source. Stem rust was very general throughout the state on winter wheat which was too far advanced to become damaged by the rust. (Thiel, Cereal Courier 13: 140-141, July 20).

Washington: Have seen none and have had no reports. (Heald, July 15).
California: Puccinia graminis has caused considerable damage to wheat in the Sacramento valley. In some instances the damage amounted to 50%. The total loss is considerably less. (Mackie, July 1).

Leaf rust caused by Puccinia triticina.

Supplementary reports on leaf rust further testify to the fact that the disease was bad this year.

Kentucky: Very severe over all of state. Many fields show 80-100% infection of upper leaf at flowering time. Severity probably due to rapid spread during a warm period in March. (Valleau, July 1).
South Carolina: Present but not so abundant as usual. Damage slight, not over 3-5%. (Ludwig, July 15).
Oklahoma: The rusts have been very bad this year, especially the orange leaf rust, practically all fields of wheat being badly infected with it, usually 40-65% according to the chart. Kanred and Black Hull Turkey varieties showed usually about 10%, showing much resistance to the rust. (Stratton, June 27).
Ohio: The attack has been very severe and the farmers feel that it has cut the yield more than any other one thing in many cases. Certain it is that in those areas most affected they are only threshing out 3-10 bushels of wheat to the acre. Extreme southern Ohio was worst affected. (Clayton, July 15).
Michigan: Extremely common, loss probably small. (Coons, July 15).
North Dakota: There is considerable leaf rust in the winter wheat and in the varieties of common spring wheat. (Smith, Cereal Courier 13: 144. July 20).
Nebraska: Heavy infection. General throughout state. (Goss, July 15).
Washington: Present in severe form in some fields, especially severe in the club hybrids. (Heald, July 15).
California: Puccinia triticina was very abundant in nearly all wheat fields but was more pronounced in the Sacramento valley and Delta regions where damage resulted, especially in spots of lodged grain. (Mackie, July 1).

Stripe rust caused by Puccinia glumarum.

This rust has been reported from Washington, Oregon, and California as present in small amounts. At Moro, Oregon, D. E. Stephens made the observation that Fortyfold x Federation hybrids in the nursery were especially susceptible and at Chico, California, Florell reports the White Federation as susceptible and the Hard Federation as being rarely affected.

Scab caused by Gibberella saubinetii.

Scab has not been reported as especially serious thus far this season. Ohio, West Virginia, and parts of Pennsylvania have experienced local outbreaks but outside of these states no reports of serious damage have been received as yet.

New Jersey: Common, but not serious. (Cook, July 15).
Pennsylvania: Wheat scab this season is very common and has caused considerable

damage, as much as 4% of the grain being shriveled and undeveloped. Between the two diseases (scab and loose smut) one of the fields of the 'Pennsylvania 44' will be fit only for chicken feed. (Erie County) (Muncie, July 15).

Ohio: During the fore part of the season scab was very little in evidence. About June 15 this trouble became epidemic in Ohio, however, and since then has caused heavy loss with certain varieties. Of the pedigreed wheats, counts in many fields have shown that the Portage is very subject to scab attack while Gladden and Trumbull are not. In one case where three varieties were planted side by side in the same field the counts were: Portage 12%, Ohio Pride 2%, and Trumbull 1%. Fields of Portage with as many as 50% of the heads affected by scab have been reported, while the average for the state has been around 10%. Gladden under the same conditions has shown about 1.5-2% of scab and Trumbull about 1%. (Clayton, July 15).

Michigan: Trace only. (Coons, July 15).

Wisconsin: Not a large amount. Less than in 1920. (Vaughan, July 15).

Nebraska: Very slight, general infection. (Goss, July 15).

Root rots caused by various fungi.

Another case of foot rot associated with Ophiobolus has been reported by H. P. Barss from Oregon. The report is from a farm at Mosier where 50 acres are affected, 10 acres being entirely destroyed and 20 acres hardly worth harvesting. In 1919 the 10 acre tract yielded 40 tons of wheat hay.

According to C. W. Hungerford in a letter of July 23, both Fusarium and Helminthosporium have been secured from wheat plants affected with root rots collected at Rexburg, Idaho. Other outbreaks of root rot have been reported to Moscow but all of them except the one from Rexburg appear to be due to moisture or temperature conditions.

Anthracnose caused by Colletotrichum cereale.

Two more reports of anthracnose have been received, one from South Carolina and the other from Ohio. In the latter state, according to Dr. Detmers, it was generally present in fields in the central and southern portion of the state where leaf rust was severe.

Downy mildew caused by Sclerospora macrospora.

The following report of C. D. Sherbakoff gives the view point of another investigation on the newly discovered downy mildew of wheat in Tennessee:

"In my trip of May 29 to June 5, this year, Sclerospora macrospora was found in the neighborhood of Jackson, Union City, and Murfreesboro. The first two are the same points where Dr. Weston found the disease a few weeks before. Murfreesboro, however, is quite a distance from Jackson (about 50 miles east from Nashville) and is in a district of somewhat different type of agricultural practice and of a different type of soil. Considering that no special search for the disease was made, only ordinary standard wheat fields were examined, and keeping in mind that the disease had already been found in three different parts of the state, some of

which are located at a considerable distance and on different soil types, it is only natural to expect that the disease, newly discovered in the state is actually of a much wider occurrence than it had been observed so far. Nevertheless, the writer agrees with Dr. Weston that the disease does not appear to be alarming. The symptoms of the disease, as it was found on the farm of the Middle Tennessee State Normal School, are as follows: The affected plants are of dark green color, densely tufted, with twisted leaves mostly failing to head; the occasional heads that are produced are much larger than normal of the same variety, mostly sterile, often much pointed toward apex, with peduncle and upper part of the stem typically and conspicuously twisted into close zigzags; the stems and the upper leaves are abnormally thick and the latter full of oospores. The disease may possibly prove serious only during unusually wet seasons."

Disease caused by Leptosphaeria sp.

Concerning the symptoms of the newly discovered Leptosphaeria disease of wheat in California, W. W. Mackie reports as follows:

"The major attack of this fungus appears to be centered on the wheat plant just above the crown close to the surface or below the surface of the soil. There appears to be a girdling effect on the culm due to the appearance of a vertical lenticular shaped area of deadened affected tissue. In many cases the whole culm is decidedly browned and darkened, causing a weakening of the plants and in the worst cases resulting in death before the kernels have reached maturity. The disease appears to be more or less concentrated in localized spots, but the fields do not present true spotting such as is noticed in the attacks of take-all. Within a small area or spot there may be a large number or majority of the plants badly diseased by Leptosphaeria while dispersed among them may occur a larger or smaller number of plants apparently unaffected or affected to a very slight degree. These plants mature their crops but I believe the amount is greatly reduced even on those plants which appear to be normal in their behavior. I am inclined to believe there is a certain amount of attack from this disease upon the roots of the plants also."

RYE

Stem rust caused by Puccinia graminis.

West Virginia: Quite general although rye is not widely grown. (Giddings, July 15).

Indiana: Local; severe only in the vicinity of barberries. (Jackson, July 15).

Michigan: Heavy rusting; loss probably not more than 5%. Epidemics near barberry locations in southwestern Michigan with no general infection in district. (Coons, July 15).

Wisconsin: Less than usual. (Vaughan, July 15).

Nebraska: Trace, degree of infection less than 1%. General throughout the state. (Goss, July 15).

Stem rust was very general throughout the state on rye, but the infection was light. (Thiel, Cereal Courier 13: 141. July 20).

Anthracnose caused by Colletotrichum cereale.

South Carolina: Damage slight, but severe locally. (Ludwig, July 21).

BARLEY

Covered smut caused by Ustilago hordei.

Virginia: The fortieth-acre plats of barley treated for smut by Dr. G. M. Reed show as conclusive results as last year. All varieties in the varietal experiments for the current year were treated by the hot water method adn a general examination of these plats has shown but two smutted plants, both covered smut (U. hordei). The ten plats treated with formalin show occasional plants infected with loose smut (U. nuda) to three times as many infected with covered smut. The ten untreated plats have a heavy infection of both loose and covered smuts. (Taylor, Cereal Courier 13: 70. May 10).

Oklahoma: The smuts have also caused a loss to oats and barley. One field of barley showed a loss of 22% due to both smuts. (Stratton, June 27).

South Dakota: There is very little covered and loose smut - in fact I have seen no covered smut this year. (Evans, June 28).

Nebraska: General infection, slight. (Goss, July 15).

California: Hidden smut of barley is very rare in the state this year. In the Salinas valley and in the coast counties of southern California the attacks were the most severe amounting, however, to no more than 5% in the fields attacked. (Mackie, July 1).

Mexico: (Vicinity of Saltillo) Very heavy in some fields and some in nearly every field. Reduction in yield 5-20%. (Stakman and Christopher, July).

Loose smut caused by Ustilago nuda.

Ohio: Local; serious where it occurs, 2-27% of heads affected. First observed June 7, central Ohio. (Clayton, July 15).

Mexico: (Vicinity of Saltillo) Fairly prevalent, but not very abundant. Loss slight. (Stakman and Christopher, July).

Stem rust caused by Puccinia graminis.

Nebraska: General infection, especially heavy on late planted barley. Degree of infection 10-15%. (Goss, July 15).

California: Barley showed evidence of stem rust injury in places. (Mackie, July 1).

OATS

Smuts caused by Ustilago avenae and U. levis.

The report of Mackie concerning the non-propagation of oat smut in California is of interest.

Virginia: General and about the same as usual in severity. Winter varieties, all seed untreated, showed the following percentages in Experiment Station plots: Virginia Grey 15%, Fulghum 5%, Bancroft 5%, Appler 3%, Red Rust Proof 0. (Fromme, July 15).

West Virginia: Quite general this season and causing probably 5-10% loss. (Giddings, July 15).

Kentucky: Seven to fifteen per cent. Seed treatment not commonly practiced. Complete control with formaldehyde dip. (Valleau, July 15).

North Carolina: Common over entire state but not considered serious. Seed treatment is now in practice in nearly every section of the state and this disease is held in check. (Foster, July 15).

Louisiana: Infection very light, loss practically nothing. (Edgerton, July 15).

Texas: Less prevalent than last year. About 2% loss. (Taubenhaus, July 1).

Arkansas: Loose smut common, varying from trace to 25% in different fields. Covered smut not as common. Very little seed treatment. (Rosen, July 15).

Ohio: This generally is not severe though worse in some counties than others; the amount depending, it seems, on how general seed treatment has been in the past few years. Many treated fields have been seen where there was not a single smutted head. Other fields have been observed with as high as 8% smut. (Clayton, July 15).

South Dakota: Heads short and more smut than usual. (Bureau Crop Estimates Crop Notes, week ending July 2).

Nebraska: General infection, less than 1%. (Goss, July 15).

Kansas: Field inspection of Kanred wheat and Kansas Fulghum oats has been completed. When inoculated with smut, Kansas Fulghum remains much freer than most varieties of white oats, but several fields of Fulghum have been inspected which had 10% of smut, hence the variety can hardly be called highly resistant or immune. (Parker, Cereal Courier 13: 125. July 10).

Washington: Small amount of U. avenae on west side. About the average amount of U. levis in the Inland Empire. (Heald, July 15).

California: Oat smuts as usual were not found to any extent except in fields where eastern seed was sown. Apparently the climatic conditions prevailing over the state are unfavorable to smuts of oats. No oat seed is treated for smut as a rule. (Mackie, July 1).

Stem rust caused by Puccinia graminis.

Nebraska: Stem rust was very general throughout the state on oats. The infection was quite heavy. (Thiel, Cereal Courier 13: 141. July 20).

California: Stem rust has injured oats in the Sacramento valley, the damage being variable. (Mackie, July 1).

Crown rust caused by Puccinia coronata.

As in the case of the leaf rust of wheat this oat rust seemed more preva-

lent than usual this year.

West Virginia: Causing considerable injury at the higher altitudes. (Giddings, July 15).
South Carolina: Present, damage slight. (Ludwig, July 1).
Louisiana: Infection very heavy. Decreased the crop about 20%. Due to the fact that a large amount of seed was shipped in from Texas for planting purposes. (Edgerton, July 15).
Texas: Red rust was exceedingly serious this year and reduced the yield about 10%. The Texas Red Rustproof was decidedly susceptible this year, due perhaps to the wet season. (Taubenhaus, July 1).
Arkansas: Common and rather severe on late maturing varieties. (Rosen, July 15).
Kansas: Crown rust of oats is unusually severe. Field inspection of Kansas Fulghum oats has been completed. This variety is heavily infected with crown rust and is as susceptible or more so than Red Rustproof. (Parker, Cereal Courier 13: 125. July 10)

Bacterial Halo spot.

Kentucky: Quite commonly observed but causing very slight damage. Controlled to trace with formaldehyde dip. Leaf blight, caused in part by halo spot, cause of remainder not determined, but not thought to be bacterial. Leaves turned yellow and died, both lower and upper. Quite common and injurious in spring oats killing portion of plants. (Valleau, July 15).
North Carolina: The bacterial blight of oats seems to be rather prevalent and widespread this season. (Foster, April 23).
Arkansas: Noticeable amount present on spring oats in seedling stage. (Rosen, July 15).
California: Halo blight of oats was found in the interior valleys and coastal regions as usual. The attack was common but appeared to cause very little damage. (Mackie, July 1).

Root rot(cause not determined).

Ohio: This apparently is a new disease of oats that has been brought to our attention for the first time tjis year. The field characteristics are a stunting and yellowing of the plants. It appears in irregular spots in the fields. When diseasd plants are pulled up the root system is found to be very scanty, with the few remaining roots in a much decayed condition. The trouble was reported by Mr. Cave, the Fulton County Agent. Growers having this disease state that the same spots appear in the fields each year that oats are planted. Other crops such as corn, wheat, and clover are not affected. (Clayton, July 15).

RED CLOVER

The Plant Disease Survey wishes to collect this season as much data as possible on the occurrence of red clover diseases. Collaborators and readers of this Bulletin are asked to make a special effort to collect and report information on diseases of this important hay and rotation crop. Our present knowledge of the clover disease situation is very inadequate. We have reason to suspect

that diseases are playing an important part in some of the clover failures that are occurring but definite data are not available. A case has just come to our attention of red clover at Arlington Farms, Virginia that is practically a failure on account of diseases, apparently anthracnose and a root rot of some kind being the principal causal factors.

Anthracnose caused by Gleosporium caulivorum was reported by John L. Sheldon from Central Village, Connecticut, May 4, as the first he had ever seen there. E. E. Clayton reported it as general but not serious in western and southwestern Ohio. First observed June 9 in western Ohio.

Wilt caused by Fusarium sp. was reported from Ohio by A. D. Selby on May 6 as follows: "Our advices the present season show the very serious killing out of red clover by what we reported last year (see Plant Disease Bulletin Supplement 15: 172) as 'Wilt, caused by a Fusarium sp.' reported by us from three counties in Ohio, 1920. The cultures obtained in both 1920 and 1921 have conformed very suggestively to the behavior of Fusarium roseum, and we have under way investigations which we trust will lead to the more complete identification of the causal organism and the possible inter-relations with scab of wheat and Fusarium root rot and ear mold of corn."

Crown rot caused by Sclerotinia trifoliorum was reported from Kentucky by W. D. Valleau as follows: "On April 29 Mr. Fergus, of this Station, called my attention to sweet clover which was dying, and on examination we found it to be very severely affected with the crown rot caused by Sclerotinia trifoliorum. Probably 5% of the plants were dead and in the neighborhood of 30% severe injury. Previous to this, we had found it on crimson clover, red clover, and alfalfa, causing very serious damage. I have also found it on sweet clover in Logan County. So far as we have been able to determine it has not been reported on sweet clover up to this time. At least we have been unable to find it in the literature, and I thought that the appearance of it might be of particular interest in view of the widespread use of sweet clover throughout this section of the country."

FRUITS

APPLE

Scab caused by Venturia inaequalis.

Additional reports have been received indicating the general prevalence and severity of scab, an abundance of infective material residing over from last year, a mild winter. Failure of growers to spray on account of small crops, and the favorable scab weather of this season, are probably all factors that have combined to make this a bad scab year.

Connecticut: The worst outbreak in years. (Clinton, July 1).
Pennsylvania: First report Adams County, May 11. Very prevalent again this year. Will cause heavy damage even where there is no fruit. (Thurston, July 1).
Virginia: General on foliage this year. Very little fruit left on trees. Severity on leaves accounted for by general lack of spraying owing to frost damage. Scab began to appear on leaves early in May. (Fromme, July 15).
North Carolina: Worst I have seen in years, especially in the mountain counties.

The fruit was all killed and very little spraying was done, except the dormant and pre-pink. Nearly all of the trees are defoliated by the prevalence of scab. (Foster, July 15)

Ohio: The epidemic is state wide now and the disease is present everywhere so far as we know. It is just beginning to be conspicuous on the leaves and fruit in extreme northern Ohio. The early infection on the fruit there was not severe except with the more susceptible varieties. (Clayton, July 15).

Illinois: Worse than usual on both foliage and fruit. This is due in part to the fact that most growers gave up spraying when they found that a very light crop was expected. (Anderson, July 1).

Wisconsin: Very bad on unsprayed or poorly sprayed orchards. (Vaughan, July 1).

Washington: General in western Washington. More in eastern Washington than any year since 1915. (Heald, July 1).

Blotch caused by *Phyllosticta solitaria*.

In North Carolina blotch is said to be common in some of the small orchards. In the southern part of Illinois it is causing considerable damage, according to Anderson, who says:

> "About as usual. Developed later on some varieties. Not a serious factor in northern Illinois. Very bad infection on orchards in south where many growers failed to spray on account of expectation of small crops. Apples in one orchard of Yellow Transparents were almost ruined."

Fire blight caused by *Bacillus amylovorus*.

Fire blight is said to be generally destructive in North Carolina and Wisconsin, more so in the latter state than had ever been noticed before, according to Vaughan. It is reported as locally serious in several other states. As with scab and other diseases, the general lack of interest in the care of trees is responsible for much of the damage due to fire blight.

Connecticut: More than the usual amount. (Clinton, July 1).

Pennsylvania: First report of twig blight in Center County May 16. Generally present but serious only locally. (Thurston, July 1).

Virginia: Not general nor of importance this year althought severe locally, particularly in extreme southwest. (Fromme, July 15).

North Carolina: Common and destructive over entire state wherever apples and pears are grown. Very destructive this year because of the lack of attention the trees have received since there is no fruit. (Foster, July 15)

South Carolina: Abundant, no estimate of damage. (Ludwig, July 15).

Ohio: This trouble is becoming more and more prominent over the entire state. Many large trees are seen that look brown because of the amount of twig blight, and - more serious - many young trees are badly affected.

Illinois: Very serious in several localities. Developed later than usual this season, causing serious die-back of many trees especially in northeastern part of state. (Anderson, July 1).

Wisconsin: This disease is widespread and more destructive than ever seen before. Hold over cankers determined on Transcendent crab, also probable on McMahon and Wealthy. Orchards with Transcendent almost sure to be badly blighted. (Vaughan, July 1).

Frog-eye leafspot caused by Sphaeropsis malorum.

Considerable injury due to this disease has been reported from Connecticut, Southern Pennsylvania, and Virginia. In Pennsylvania it was first observed April 28, in Cumberland County.

Cedar rust caused by Gymnosporangium juniperi-virginianae.

Rust has been reported as general and severe in the parts of Virginia where cedars occur, and as less important than last year in Illinois. Although it was observed on cedars in South Carolina this spring, it has not been reported on apples, according to Ludwig.

Virginia: General and severe in sections where cedars occur. Unusually prevalent in Piedmont this year. First observed May 10, but severe infection came with rains late in May. (Fromme, July 15).

Powdery mildew caused by Podosphaera leucotricha.

Powdery mildew is reported from Pennsylvania, where it is locally severe, and from Washington, where it is said to be common in the central irrigated valleys and in the Coast country, and according to some growers is more abundant than usual.

Anthracnose caused by Neofabraea malicorticis.

The only report of this disease so far received is from Washington, where it is said to be fairly common west of the Cascades and severe in the White Salmon section.

PEACH

Brown rot caused by Sclerotinia cinerea.

The following additional reports of brown rot have been received:

Connecticut: Some injury to young twigs through blossom infection. (Clinton, July 1).
Pennsylvania: Reports few compared with last year. There are few peaches in the state and damage will be slight. (Thurston, July 1).
Virginia: One report from York County on green fruit following curculio injury. May 24. Also the only record of any peaches within the state this year. (Fromme, July 15).
Kentucky: No fruit. No twig blight observed. (Valleau, July 15).
North Carolina: Very destructive this year over entire state, in some instances destroying the entire crop. Found mainly in the small orchards where spraying is not practiced. The apothecia appeared early because of the mild winter and spring. (Foster, July 15).

Arkansas: Not serious this year on peaches. (Elliott, July 15).
Illinois: None to date. Not as much on market peaches as usual. Very little twig infection observed. Some on Texas peaches in market. (Anderson, July 1).

Leaf curl caused by Exoascus deformans.

Arkansas is the only state in which leaf curl is said to be more severe than last year, although several report it as causing severe local damage.

Connecticut: A few complaints. (Clinton, July 1).
Pennsylvania: First report April 3, Arendtsville, Pennsylvania. Generally present in the state. Damage slight this year. (Thurston, July 1).
Kentucky: Present in usual amounts. (Valleau, July 15).
North Carolina: Common over entire state but more destructive in the Piedmont and Mountain counties, probably because of the cooler and moist climate. (Foster, July 15).
Arkansas: Much more severe than usual. Some trees practically defoliated. (Elliott, July 15).
Ohio: It is reported from a number of localities but does not seem to be doing serious damage. (Clayton, July 15).
Illinois: Serious in a few orchards. Not as bad as last year. (Anderson, July 1).
California: Generally prevalent, causing moderate damage. Observed in San Francisco Bay region, Santa Cruz and vicinity, Los Angeles and vicinity. (W. S. Fields, July).

Scab caused by Cladosporium carpophilum.

In North Carolina scab is said to be common wherever peaches are grown, in unsprayed or improperly sprayed, and especially in small orchards. The disease is abundant on the twigs, but is not causing serious injury, in Illinois, according to Anderson, who states also that it was commonly observed on Texas peaches in the market.

Bacterial spot caused by Bacterium pruni.

Only slight amounts of bacterial spot have appeared in Connecticut as yet. In Illinois, although not as important as last year, it is causing some defoliation, throughout the state, and is especially severe in Johnson County, according to Anderson. The weakening result of the freeze is thought to be responsible for the severity of the disease in Arkansas, where it is especially serious on year-old nursery stock.

FIELD AND VEGETABLE CROPS

BEAN

Bacterial blight caused by Bacterium phaseoli is reported as common but

causing slightly less loss than usual in Louisiana; and as unimportant in Wisconsin.

Anthracnose caused by Colletotrichum lindemuthianum - reported from Louisiana as follows: "Common and serious in some localities. The failure to raise a fall crop for seed increased the infection this season. (Edgerton, July 15).

Rust caused by Uromyces appendiculatus - reported from Louisiana as very common and destructive on certain varieties, especially some of the pole varieties. (Edgerton, July 15).

Mosaic (cause undetermined) - reported from Louisiana as very common on bush, pole, and Lima beans but apparently not causing very heavy loss except on occasional plants. (Edgerton, July 15).

CABBAGE

Black rot caused by Bacterium campestre.

Louisiana: Very common and very severe especially on the spring crop of cabbage. In places, whole fields rotted down. (Edgerton, July 15).

Texas: Prevalent; about 1% loss. (Taubenhaus, July 1).

Minnesota: I was in Plainview this summer and saw one field that I would estimate as a 95% loss; out of every 100 plants there were only 5 worth anything at all. I saw more or less loss in every field that I visited. (J. G. Leach. Minnesota Horticulturist 49: 169. June).

Soft rot caused by Sclerotinia libertiana.

Virginia: A soft rot due to Sclerotinia (probably libertiana) was quite destructive on cabbage in a home garden at Charlotte Court House. The heads were fairly well formed at the time. The plants had been brought from South Carolina. (Fromme, July 1).

Louisiana: Very common and causing serious loss. Counts in many fields showed a loss of from 1-20%. Average loss about 3-5%. (Edgerton, July 15).

PEANUT

Rust caused by Uredo arachidis.

This rust, to which J. C. Arthur called attention in a note in Science (Two destructive rusts ready to invade the United States. Science n. s. 51: 246-247. March 5, 1920) had previously been found in Florida by C. D. Sherbakoff. Regarding his discovery Sherbakoff writes July 16:

> "The rust was found August 30, 1918, in a field on the farm of the Florida Experiment Station, at Gainesville. Only about four or six plants were found to be affected, all in a close cluster. The variety was White Spanish. No other peanut plants affected with the rust were found either in the same field or in any other field, although fairly close attention was paid to it, at least during that

and the next season. The field was not harvested for some time after the rust was found, but no noticeable spread of the trouble was observed during the remainder of the season.

"The rust was examined with the microscope and found to resemble closely the one reported in literature. Due to the fact that the disease did not seem to be of any importance, under the conditions under which it was found, no further attention was paid to it except that some specimens were preserved and a watch was kept for its reappearance and spread.

"Immediately after reading the article in Science, some of the rusted peanut leaves were sent to Dr. Arthur for his examination. He replied that the rust collected by me was the same to which he made reference - Puccinia (Uredo) arachidis - and that he was glad to hear that the disease was apparently of no alarming importance under our local conditions.

"Recently hearing that Dr. Orton is interested in the rust, I have sent him some of the specimens with a brief statement in regard to the time and place of its finding."

POTATO

Late blight caused by Phytophthora infestans.

A report of the presence of this disease in the Hastings region in Florida was received from O. F. Burger in April. It has been found by field men of the potato wart survey in Pennsylvania in practically every section of the counties visited (Jefferson, Indiana, Somerset, Armstrong), and has also been reported from West Virginia. In the latter state it was first found about the first of July at Beverly in Randolph County, where it was said to be rather bad in one garden. A later report (July 19) from Giddings states that the disease is very prevalent at Davis and Thomas, both in Tucker County, with weather conditions favorable for a severe epidemic.

Early blight caused by Macrosporium solani.

West Virginia: Mr. Sherwood reports some potato fields in the northwestern part of the state as very badly diseases with the early blight. (Giddings, July 2).

Texas: Prevalent. About 1% loss. (Taubenhaus, July 1).

Stem rot caused by Rhizoctonia sp.

South Carolina: Present in abundance on northern seed shipped in for planting the early crop. May have been contributing cause for a rot of seed pieces in the ground with consequent failure of plants to come up in Charleston County. (Ludwig, July 1).

Texas: Prevalent. One per cent loss. (Taubenhaus, July 1).

South Dakota: Rhizoctonia has appeared in several potato fields, in one doing considerable damage. (Evans, June 28).

Arizona: Fifty to eighty per cent of plants infected in the Santa Cruz Valley,

Southern Arizona. First observed May 15, at Rillito Station. Dry weather; hot days and cold nights. Mostly Peerless planted in worst fields. In spite of efforts of County Agent and Pathologist, no treatment resorted to. (Brown, June).

Leaf roll (cause undetermined).

Leaf foll is prevalent in Erie County, Pennsylvania, according to J. H. Muncie, and apparently the amount has not been greatly reduced by the roguing of affected plants practiced last year. It is reported by field men of the potato wart survey in Pennsylvania as common in the sections visited - Jefferson, Indiana, Armstrong, and Somerset Counties. Its presence is also recorded from South Carolina and California. It is said by D. G. Milbrath to be severe throughout the latter state, causing 30% injury in Los Angeles County.

Tip-burn (non-parasitic).

The statement by B. F. Lutman of Vermont concerning the cause of tip burn is interesting:

Vermont: The secret of tip burn on the potato foliage is to be found in hydathodes or water pores. It will be recalled that while the plant can control the opening and closing of the stomata, the hydathodes remain open permanently and that the orifice of the hydathode is at least four times that of a stoma. The average leaflet shows about 70-80 of these organs grouped around the margin on the upper side and largely massed toward its tip end. A large marginal vein runs practically all around the leaf directly under these water pores. The death of this marginal vein is due to the loss of water from the pores over it and is indicated by a browning of the entire region, but particularly of the bast of this vein. This is the beginning of tip burn. Five or six of these large pores are grouped in a mass almost at the tip of each leaflet and the results are first evident there.

The demonstration is very simple on leaves treated as follows: Boil leaves for a few minutes in water, drain, soak for 12-24 hours in 95% alcohol and then in a 5% solution of sodium hydroxid, wash in water and neutralize with a little hydrochloric acid, place in 50% glycerine for 24 hours and then mount on a glass plate in pure glycerine. (Lutman, July).

West Virginia: Some tip burn. (National Weather and Crop Bulletin, week ending June 7).

Ohio: Tip burn seems to be almost epidemic this year and it is doing much damage. The southern half of the state is most affected at present but the trouble is present in northern Ohio. (Clayton, July 15).

South Dakota: Tip burn is very common in potatoes. (Evans, June 28).

Nebraska: Considerable tip burn and plants drying up rapidly in south. (Bureau Crop Estimates Crop Notes, week ending July 2).

Anthracnose caused by Colletotrichum atramentarium.

The following report of July 19 from N. J. Giddings regarding the occurrence of potato anthracnose in West Virginia is of interest:

"I found this disease causing quite a little injury in one field near Morgantown this spring. There is no doubt in my mind from all the evidence secured in the field, as well as in the laboratory, but that the Colletotrichum was the cause of the injury in this case. A similar injury was reported to be troublesome in some other gardens and Mr. Berg advised me that he saw the same thing in some other sections which he visited during June. I believe that this disease is quite prevalent, although probably it does not often cause sufficient injury and become so conspicuous as to direct attention to it. Pure cultures of the fungus were readily obtained."

Leaf blotch caused by Cercospora concors.

Leaf blotch of potato, which is apparently rather rare in the United States, was observed in West Virginia recently by Giddings, who says concerning it (July 19):

"I found the potato leaf blotch, Cercospora concors, in two gardens at Davis. The disease was quite prevalent in one garden and had evidently caused a large amount of injury. The badly affected leaves dropped off very easily and there were only a few leaves left near the tops of the plants. The disease was fully as bad in the part of the garden where there was no shade as it was in one place where there was a little shade. The variety of these potatoes was said to be Early Rose. In the other garden the variety was unknown and the disease was apparent only in some small spots. The two gardens were not near together."

Germination troubles.

Germination troubles similar to those reported in the July 1 issue of the Bulletin occur in Ohio and Wisconsin also, according to the following reports:

Ohio: A very common complaint now is "I have only 50 or 75% of a stand". Investigation of numerous cases of this kind has shown that the seed pieces which did not send up a shoot simply rotted in the ground. Since one often finds a field with a poor stand beside one with a good stand, both planted at the same time, the situation looks puzzling. However, it is generally the case that the field with the poor stand was plowed late or the soil otherwise treated so that it became very dry after planting. The extremely hot weather combined with this soil condition seems to be primarily responsible for the poor stand. (Clayton, July 15).

Wisconsin: Late potatoes making a poor growth since the soil has been dry practically ever since they were planted. Some seed is rotting and as a result the stand is spotted. (Crop Notes of the Bureau of Crop Estimates for week ending July 2).

TOMATO

Bacterial blight caused by Bacillus solanacearum.

South Carolina: Not reported but doubtless present. Greatest loss is due to

necessity of leaving tomatoes completely off infected soil. (Ludwig, July 15).

Mississippi: One field observed at Poplarville, Pearl River County, with a trace of bacterial blight. (Neal, July 15).

Fusarium wilt caused by Fusarium lycopersici.

South Carolina: Present, local. Problem met with resistant varieties. Loss not estimated. (Ludwig, July 15).

Mississippi: Tomato wilt occurred in about the same amount as last season. First reported from Utica, Mississippi on May 25. Large quantities of wilt resistant seed was again distributed to club girls, county agents, and other individuals. We are expecting satisfactory reports from these trials as soon as the harvest season is complete. (Neal, July 15).

Arizona: Reported from Winkleman, June 3, and St. David, June 27. Serious at Winkleman. Weather very dry; hot days and cold nights. (Brown, June 27).

Buckeye rot caused by Phytophthora terrestris.

According to F. J. Pritchard buckeye rot is developing to a serious extent in a planting of tomatoes on the Arlington Experiment Farm of the United States Department of Agriculture. The disease is also reported from Tennessee by C. D. Sherbakoff as follows (July 25):

> "In October, 1920, I found on the local market at Knoxville some tomato fruit affected with an injury that resembled a very early infection with buckeye rot fungus. However, as no fungus could be isolated from the fruits, the matter was left until this season. Today I examined a small tomato field on the farm of the Tennessee Experiment Station and found at least 5% of the fruit affected with buckeye rot, in all stages from recent infection to complete decay. The fruits completely invaded by the fungus, when found on the ground early in the morning, were covered with a luxuriant growth of the white aerial mycelium of the fungus. When specimens of the rot were shown to several men at the Station they stated that it had been observed in their home gardens. This would indicate that the disease is not uncommon and may be found in many other parts of the state."

Leaf spot caused by Septoria lycopersici - local occurrences of this disease have been reported from Pennsylvania and Mississippi, and it is said to be abundant in South Carolina.

Early blight caused by Macrosporium solani - I. C. Jagger observed this disease in seedbeds at Palmetto, Florida in the early part of March. A recent report from West Virginia indicates that it occurs to a considerable extent in the northwestern part of that state. In Mississippi, according to D. C. Neal, the season has been so dry that there is very little early blight infection.

Blossom-end rot (non-parasitic) - Dry weather in South Carolina and Mississippi has caused a rather serious development of blossom-end rot, according to collaborators in those states. In South Carolina the damage is estimated at 5-10% at present, but recent rains will probably check further increase. Heavy applications of nitrogenous fertilizers apparently aggravate the severity of the disease in Mississippi.

THE PLANT DISEASE BULLETIN

Issued By

THE PLANT DISEASE SURVEY

Volume V Number 4

August 15, 1921

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

Vol. V. August 15, 1921. Number 4.

Items of Interest in the August 1 Number of the Bulletin.

Attention is called to the following items of especial interest in the last number of the Plant Disease Bulletin (Vol. V, Number 3).

1. Downy mildew of wheat in Tennessee as reported by C. D. Sherbakoff.

2. The symptoms of the Leptosphaeria disease of wheat as reported by W. W. Mackie.

3. A special request for information on diseases of red clover.

4. Peanut rust reported for the first time in the United States. It occurred in Florida in 1918.

5. Explanation of cause of tip burn of potato and method of demonstrating waterpores.

6. Leaf blotch of potato collected in West Virginia.

7. First report of buckeye rot of tomato in Tennessee.

Important Survey Notes in the Present Number of the Bulletin.

1. Bacterial root and stalk rot of corn reported from Louisiana and Illinois.

2. The clover nematode (*Tylenchus dipsaci*) reported from several places in Oregon on strawberry and also found on alfalfa.

3. Reports on apple diseases from Oregon.

4. Potato wart found in new localities in the western Maryland district.

5. "Phoma" blight of cotton found in more places in Arkansas.

6. Reports on tobacco diseases from Virginia and North Carolina.

CEREALS

WHEAT

The total production of wheat this year as estimated by the Bureau of Markets and Crop Estimates, August 9, will be 757,000,000 bushels or 30,000,000 bushels less than last year - this in spite of the fact that the acreage is only slightly reduced, being 99.2% of that of 1920. The condition of spring wheat dropped from 80.8 to 66.6 during July, probably on account of drought and heat. This puts the condition of spring wheat at 6.6% below the ten year average. Winter wheat on July 1 was reported as 77.2% or 3.8% below the July 1 ten year average.

Stem rust caused by *Puccinia graminis*.

The following reports further indicate subnormal amounts of stem rust this year. The Minnesota report is probably representative of much of the spring wheat area.

Pennsylvania: Very rare this year. Wheat ripened early. (Thurston, July 15).
Maryland: Local. Loss slight. (Temple, July 1).
Illinois: Probably 5 or 10% on spring wheat, according to the United States Department of Agriculture scale for estimating rust. (Dungan, Aug. 1).
Minnesota: First reported on wheat about June 15, from Dakota County. Found on grasses on May 29. The rust came early and developed rapidly until the excessively hot weather in June checked its development and spread. Under favorable weather conditions there would have been a very severe epidemic since the rust started earlier than usual and was universally present. However, the hot weather not only checked the development and spread of the rust, but ripened the wheat prematurely so that the damage caused by rust was not as serious as that caused by heat. It is almost impossible to estimate the relative amount of damage done by the rust and by the heat. (Department of Plant Pathology, July 15).
Texas: Very prevalent, total loss 4%. (Taubenhaus, July 15).

Leaf rust caused by *Puccinia triticina*.

More reports are at hand showing the prevalence of leaf rust this season.

Pennsylvania: Unusually abundant, particularly in southeast section of the state. Loss considerable. (Thurston, July 15).
Maryland: Severe, causing at least 5% loss inyield and quality. (Temple, July 1).
Illinois: Universally distributed where spring wheat was grown in Illinois. It ran as high as from 25 to 40%, according to the United States Department of Agriculture scale for estimating rust. (Dungan, August 1).
Minnesota: First reported May 6 in Ramsey County. The leaf rust of wheat came early this year and was much more prevalent than it usually is. The degree of infection ranged from trace to 100%. As far as has been determined, no damage was done. This likely is partly due to the fact that

most of our spring wheat varieties are moderately resistant to the diseas Furthermore, the hot weather checked the development of the rust and probably prevented it from doing any damage. (Department of Plant Pathology, July 15).

South Dakota: Leaf rust of wheat was state wide and much more prevalent than usual. Eighty per cent of the fields showed 100% diseased plants. It first appeared at Brookings early in June. Some varieties were quite resistant, while others proved to be very susceptible to the rust. (Evans, August 11).

Scab caused by Gibberella saubinetii.

Apparently it has been too dry in the spring wheat states for heavy scab development this season with the result that less of it is showing than for a number of years. In spots where most rainfall occurred and where wheat followed after corn, some damage was reported.

Pennyslvania: Localized, very slight infections this year. (Thurston, July 15).

Maryland: Two fields were found with a loss of 20%, several with 10%, but the average is probably close to 3% for the state. Our surveys were run in part before all of the scab showed up. (Temple, July 1).

Illinois: In northern Illinois scab on spring wheat was very severe; running as high as 30% on the average. In central Illinois it was as bad as 12%. Little or no spring wheat is grown in southern Illinois. (Dungan, August 1).

Wisconsin: For the state as a whole infection was generally light, but in spots in the southern part of the state, where more rain occurred and where wheat followed corn there was some damage. (Johnson, August).

Minnesota: First reported June 28 from Nicollet County. Fairly generally distributed on the heads. Seedling blight fairly common, but often confused with other root rots. Infection fairly heavy. In some fields there was no appreciable loss and in others the loss was considerable. (Department of Plant Pathology, July 15).

South Dakota: Wheat scab was slight this year, being much less prevalent than for the past four years. The estimated loss for the state was 1-2% and occurred east of the Missouri River in most cases. It was first reported from Brookings in June. (Evans, August).

CORN

Judging from the recent figures issued by the Bureau of Markets and Crop Estimates (August 9, 1921), corn is a good crop this year. The acreage is 104.1% of that of last year and the condition 84.3% as compared with 86.7% on August 1, 1920. The crop was adversely affected by drought in many places during July, causing a falling off of the estimated production.

Smut caused by Ustilago zeae.

The reports that have been received to date show an unusual amount of corn smut in certain places. In parts of West Virginia and Virginia the disease is worse than usual and in South Dakota A. T. Evans reports as follows concerning the abundance of the disease:

"I wish to call your attention to the very severe epidemic of corn smut which we are having throughout the state. I have examined many fields and find none which do not have an over abundance. Many letters reach me weekly concerning this disease. Many farmers declare it has ruined crops."

Collaborators and others are requested to make as many observations as possible on corn smut this year and report the same to the survey. Accurate counts of percentage affected plants, ears, tassels, etc. are needed, and an effort should be made to determine how much actual loss the disease is causing.

Root rot caused by Gibberella saubinetii.

Ohio: This trouble is showing up about as usual at this time of the year. A number of fields have been observed where the corn was stunted and yellow and in addition several reports of such trouble have come in. The effects of this disease will be more in evidence as the season advances. (Clayton, July 15).

South Dakota: Corn root rot is appearing in quantity in various localities. (Evans, June 28).

The damage is slightly more than last year and will probably cause a 5% loss throughout the state. It is most prevalent in the central part of the state and was first reported at Brookings in May. (Evans August).

Bacterial root and stalk rot.

The disease of field corn reported by Rosen from Arkansas (Abstract in Phytopath. 11: 32. 1921) has now been reported in Illinois and Louisiana as shown by the following notes:

Illinois: A few days ago I received two samples of corn - one from Jackson County and one from Monroe County which showed typical symptoms of the bacterial stalk and root rot disease as described by Prof. H. R. Rosen, of Arkansas. I furnished him specimens of this disease from both of these counties and he has reported that without doubt it is the serious disease that occurs in Arkansas. It is the first occurrence of this trouble as far as I know in Illinois. Dr. Burrill, of course, did some work on the bacterial disease of field corn, but we are not able to learn definitely as to whether he was dealing with the same disease as the one that is showing up in these counties. (Dungan, August 1).

Louisiana: The bacterial stem rot of corn described by Rosen from Arkansas has been known in Louisiana since 1908. I saw it the first year that I was in Louisiana and have seen it to some extent nearly every year since. Some years it is very troublesome in some localities and other years it is of little importance. There was some complaint this year on some of the reclaimed soils in southern Louisiana. (Edgerton, August 11).

FRUITS

APPLE

Less than half of the apple production of last year is estimated by the

Department of Agriculture for the present season. A yield of 109,000,000 bushels is expected as compared with 244,000,000 of 1920.

Scab caused by Venturia ineaqualis.

Vermont: Much less than usual. Fair amount of leaf infection but it seems to have ceased to spread. (Lutman, July 15)

Texas: No record. Probably never occurs in Texas. (Taubenhaus, July 15).

Oregon: Scab negligible in Jackson County and absent from eastern Oregon. The Umpqua and Willamette Valleys and coast counties are showing unusually heavy infection, some orchards having lost much of the crop while in blossom; much defoliation was experienced in some sections. The losses will be more severe than in many years on account of spring weather favorable to scab and unfavorable to spraying for which many growers are not adequately equipped as yet. Not less than one-third of crop will be a loss in these two valleys. Hood River Valley will have not more than 2% loss from scab as fruit infections did not follow earlier and rather abundant foliage attack because of the practical absence of rain since petals fell. (Barss, July 1).

Fire blight caused by Bacillus amylovorus.

Vermont: Very common earlier in the season as twig blight, but has dried up like everything else. Did not seem to bother the pears but the apples, especially sweet varieties, were sprinkled very freely with dead twigs. (Lutman, July 15).

Texas: Very prevalent and serious, 3% loss. (Taubenhaus, July 15).

Oregon: Noticeable in many orchards in Jackson County according to Cate but damage will be far less than last season. None is reported in the Umpqua, Willamette, and Hood River Valleys up to this time. It is serious in some orchards in Wasco County. It is not reported from eastern Oregon sections as yet this year. (Barss, July 1).

Anthracnose caused by Neofabraea malicorticis.

Oregon: Present throughout western Oregon, slight damage in southern part. Losses in Umpqua Valley greatly reduced by August spray with Bordeaux last year. Willamette Valley losses in general are very severe and in the Hood River Valley lack of properly timed sprays has caused this disease to become the most serious trouble of apples in the section, according to Childs, who says orchard valuations have depreciated fully 10% due to the disease. This loss, however, is recoverable if attention is given to proper spraying. (Barss, July 1).

Powdery mildew caused by Podosphaera leucotricha - reported from Oregon: "Prevalent everywhere in the state but appears to gain headway only where scab sprays have been neglected. Jonathan variety the most susceptible." (Barss, July 1).

European canker caused by Nectria coccinea - reported from Oregon: "Reported again within state but not causing appreciable damage in general." (Barss. July 1).

Mushroom root rot caused by Armillaria mellea - reported from Oregon: "Present over western Oregon, but no worse than usual. Mostly on newly cleared land. In the Hood River Valley up to 5 or 10% losses of trees are reported in individual orchards but according to Childs not 1% of the total number of trees in this section are lost annually." (Barss, July 1).

PLUM

Brown rot caused by Sclerotinia cinerea - reported as common in New Jersey (Cook, August 1).

Shot-hole caused by Coccomyces prunophorae - reported from Ohio, where it has caused general and severe defoliation, especially on European varieties, according to Selby, who states that very little or no summer spraying has been done because of the loss of the crop due to freezing.

PEAR

Fire blight caused by Bacillus amylovorus.

Virginia: Especially prevalent in southwest portion but occurs to some extent wherever pears are found. (Frame, August 1).

Kentucky: Twig blight very severe. (Valleau, August 1).

North Carolina: The most destructive disease of pears, practically prohibiting the growth of them in this state. Very common wherever pears are grown and being a source of infection to the apples. We have received a large number of complaints from orchard men all over the state relative to methods of control of this disease. The larger growers practice the cutting out of the blighted limbs but are rather lax in the use of disinfectants. (Foster, August 1).

South Carolina: Present on all trees. Damage probably 10%. Still greater loss due to fact that pear growing can hardly be made profitable. Prospective growers must stay out of the business. (Ludwig, August 1).

Ohio: There is hardly a tree in the state that is not seriously affected. Several cases have been observed where the blight obviously started on a pear tree and spread from there to an adjacent apple orchard. (Clayton, July 15)

Scab caused by Venturia pyrina - reported from South Carolina as causing slight damage.

Leafspot caused by Mycosphaerella sentina - reported from Virginia as very severe on specimens sent from York County.

STRAWBERRY

Leafspot caused by Mycosphaerella fragariae.

Reports from Vermont, Connecticut, Maryland, Illinois, Wisconsin, and Oregon indicate that leaf spot is causing little damage in those states.

Vermont: Much less common than generally. Much dry weather seems to have suppressed it to a large extent. (Lutman, July 1).

Maryland: Our growers are using mainly the more resistant varieties. (Temple, July 1).

Oregon: Present in practically all commercial plantings in Hood River Valley, but causing no appreciable injury according to Childs. Present also throughout western Oregon appearing much more abundantly in some sections than usual due, perhaps, to the long, cool, rainy spring conditions. In general the disease causes little damage. (Barss, July 1).

Powdery mildew caused by Sphaerotheca humuli.

Oregon: Childs reports powdery mildew on strawberry not as general as usual in the Hood River Valley though in a few rather large plantings the disease was quite severe. In one acreage a fourth of the fruit or 700 crates was put in special grade on account of powdery mildew. Not more than 2% of the Hood River crop was affected. Mildewed berries generally bring 25 to 50 cents less per crate than healthy fruit. One grower tried lime sulphur spray and succeeded in reducing the disease although some burning of foliage resulted. The disease was of little general importance in the Willamette Valley or southward as far as can be judged by reports. (Barss, July 1).

Nematode (Tylenchus dipsaci).

Oregon: Found doing some damage on strawberries in the Coast sections of Lane and Coos Counties and in Benton County. All badly infected fields in Lane County were destroyed last season and only a few patches now show infection. The disease was discovered in Coos County for the first time this spring. The extent is not known as yet. The same pest has been found recently on alfalfa at Hermiston. It also occurs on clover. (Barss, July 1).

Gray mold rot caused by Botrytis sp.

Maryland reports gray mold rot as prevalent and causing a loss of probably 4%. In other states it is not said to be causing damage in the field, but in Illinois it is more prevalent than usual on market berries, according to Anderson, and food products inspectors of the Bureau of Markets and Crop Estimates report its presence in shipments from several states, as shown in the following list:

Alabama: 5 cars, mostly slight amounts.
Arkansas: 37 cars, occasional to 40%, mostly 2-7%.
Delaware: 11 cars; occasional to 40%, mostly about 2-10%.
Florida: 1 car; 75-100%.
Kentucky: 5 cars; occasional to 25%.
Louisiana: 53 cars; occasional to 30%, mostly occasional to 5%.
Maryland: 10 cars; occasional to 45%, mostly occasional to 2%.
Mississippi: 3 cars; 2 occasional, 1 20%.
Missouri: 12 cars; occasional to 35%, mostly 7-17%.
New York: 4 cars; occasional to 35%.

North Carolina: 1 car; 12%.
Oregon: 1 car; 3%.
Tennessee: 49 cars: occasional to 30%, mostly occasional to 8%.
Texas: 1 car; occasional.
Virginia: 12 cars; occasional to 13%.
Washington: 1 car; 20%.
Unknown: 6 cars; occasional to 30%.

Rot caused by Rhizopus sp.

Maryland is the only state reporting losses in the field due to Rhizopus rot, although markets inspectors have found it in shipments from several states as follows:

Alabama: 2 cars; 10% and 20%.
Arkansas: 20 cars; occasional to 45%, mostly 4-17%.
Delaware: 5 cars; occasional to 45%.
Florida: 1 car; 75-100%.
Kentucky: 5 cars; 2-33%; mostly 2-12%.
Louisiana: 63 cars; occasional to 75%, mostly 2-15%.
Maryland: 8 cars; 7 cars occasional to 5%, one car 45%.
Missouri: 16 cars; occasional to 48%.
New York: 4 cars; occasional to 35%.
Tennessee: 29 cars, occasional to 30%.
Virginia: 6 cars; occasional to 9%, mostly occasional.
Washington: 1 car, some Rhizopus.
Unknown: 8 cars; occasional to 30%.

Maryland: Has always caused great loss with us, both before and after the berries have been picked, causing altogether about 10% loss. (Temple, July 1).

Oregon: Apparently not serious in Oregon, although some complaints of decay from an undetermined cause which might have been Rhizopus were received. Rhizopus is known to be present, however, to some extent in the state. (Barss, July 1).

Leaf scorch caused by Mollisia earliana - reported from Illinois:
"Found for the first time in this state in University variety patch where it was present on a number of varieties obtained from a Michigan nursery. It was not found on Dunlap and other commercial varieties in the neighborhood." (Anderson, July 1).

Slime mold (Spumaria alba) - reported from Nebraska as causing considerable damage in a number of cases. (Goss, July 1).

A root-rot of unknown cause - reported from Maryland as follows:
"Local - causing some loss. Has been found for the past seven years, but not much complaint has been made concerning it until this year." (Temple, July 1).

VEGETABLE AND FIELD CROPS

POTATO

Although the potato acreage is slightly larger than last year a total United States production of only 316,000,000 bushels, as compared with the 428,000,000 bushels of 1920 is predicted by the Bureau of Markets and Crop Estimates. The condition of the crop on August 1 was 65.8%, while on July 1 it was 83.4% and on August 1 of 1920 it was 87.0%. Of the factors bringing about this reduction, probably the hot dry weather is by far the most important.

Wart caused by *Chrysophylyctis endobiotica*.

Wart has been discovered within the last ten days in three new mining towns in western Maryland. It will be recalled that last year it was found at Eckart Mines, Mt. Savage, and Lord in that state. The newly discovered infestations, one of which is Lonaconing, are in the same general locality as these towns. The disease is also found recurring at Lord this year.

Late blight caused by *Phytophthora infestans*.

Late blight on the late crop has only been reported thus far this season from West Virginia, Maryland, and Pennsylvania.

In West Virginia it is prevalent in Tucker County, scattered in Randolph County, and a report of two affected gardens has been received from Fayette County. Aside from these cases in parts of the state where they have had considerable rain there is a marked absence of the disease.

In western Maryland and in Pennsylvania the potato wart field men have been finding some of the disease and Nixon in the latter state reported it well distributed in Somerset County on August 5.

The dry hot weather of this season has successfully held the disease in check in most places and is liable to suppress it to such an extent that it will not do serious damage this year.

Early blight caused by *Macrosporium solani*.

Reports that the disease has not been observed are at hand from South Carolina, Ohio, and Kentucky. Other reports, given below, show that early blight is not destructive in those particular states. The dry weather has doubtless been influential in holding the disease in check.

Virginia: Present at various points in the state, but not apparently causing any serious injury. Drought so severe that foliage diseases have not flourished. (Frame, August 1).

North Carolina: Common on unsprayed potatoes but not considered serious as it comes as the crop is ready for harvesting. Found over the entire state. (Foster, August 1).

Mississippi: Early blight has not been reported as observed to as large an extent as last season. The season has been unusually dry in many parts of the state, and this no doubt is partially responsible for the disease being less severe. First reported from Hattiesburg on May 20. (Neal, August 1).

Louisiana: Present, but loss slight. (Edgerton, August 1).
South Dakota: Of slight importance this year, causing a slight loss for the state. First observed at Brookings in July. (Evans)

Mosaic (cause unknown).

Virginia: Traces found, but not severe. (Fromme, August 1).
Kentucky: Very prevalent and the cause of severe reduction in yield of early crop of cobblers. (Valleau, August 1).
North Carolina: The average infection in the early crop would probably be between 10 and 15%, but in some instances the infection going as high as 50%. Another disease growers have not recognized as specific and hence do not realize the importance of its control. This disease is being introduced every year through seed purchased from the north. (Foster, August 1).
Mississippi: Mosaic continues to be the dominant potato disease in the state. It occurred in about the same amount as last season. Bliss Triumph stock continues to develop a heavy percentage of infection. Observed and reported about the middle of May in practically all the trucking centers in southern Mississippi. (Neal, August 1).
Louisiana: Very common on Bliss Triumph causing very serious loss. Disease was particularly bad on potatoes grown from certified seed in the Alexandria district. Growers lost at least $15,000 by using this seed. Loss caused by this disease on Triumph variety all over state from 25-75%. (Edgerton, August 1).

Leaf roll (cause undetermined).

No reports of serious damage from leaf roll have been received. Potato wart field men working in Pennsylvania report it as almost universally present in the gardens that they are inspecting.

Kentucky: Common but much less serious than mosaic. (Valleau, August 1).
North Carolina: Common in the early eastern shore crop and also the crop grown in the mountains. Estimated damage to early crop about 5%. As a rule, this disease is not recognized by the average grower to be a specific disease and hence they have made no effort to rid their crop of it. (Foster, August 1).
Mississippi: Observed at Wiggins (Stone County) and also reported from Copiah County about June 1. This trouble is of minor importance as yet. (Neal, August 1).
Louisiana: Slight infection noticed in various parts of the state. Apparently of no economic importance as yet. (Edgerton, August 1).

Black leg caused by Bacillus atroseptious or B. phytophthorus.

Reported from New Jersey this year (1% affected plants), North Carolina (very destructive to early crop on Eastern Shore, probably 6% plants affected), and Ohio (young sprouts severely affected in Scioto and Stark Counties).

Tip burn, hopper burn, and drouth injury.

The hot and dry weather of the present season has caused much tip burn and premature death of the vines in many places. Reports to this effect are at hand from Virginia, West Virginia, Ohio, South Dakota, and Nebraska, and it is doubtless true of many other states.

TOBACCO

Valuable reports on the tobacco disease situation have been received from collaborators in the important tobacco producing states of Virginia and North Carolina. It is hoped that reports from other more northern tobacco states will become available later. According to crop estimates the yield of tobacco will be low this year on account of reduced acreage and poor condition (66.6% as compared with 84.1% at this time last year and 79.1%, the 10-year average).

Wildfire caused by Bacterium tobaccum.

Virginia: Found in only slight amounts and in only occasional fields. Checked by dry weather. Inspection of plant beds showed it to be present in only 8% of the beds as compared with 70% of the beds affected with angular leaf spot. (Fromme, August 1).

North Carolina: Reported in several counties this year, but not in as destructive form as in previous years. (Foster, August 1).

South Carolina: A case of wildfire or angular leaf spot in Williamsburg County was investigated June 14. A severe dry spell just preceding had apparently checked the disease. Specimens were submitted to Drs. Garner and F. A. Wolf, who agreed that the determination could not be made more definite than above. (Ludwig, August 1).

Angular leaf spot caused by Bacterium angulatum.

Virginia: Very slight as yet over the state as a whole. This is attributed to the very dry weather. Only a little rain has fallen in some sections since the crop was set in the field. Inspection of plant beds showed presence in 70% including both those from treated and untreated seed. It was found present to some extent in 50% of the beds where treated seed and new or boiled canvas was used; in 100% of those where treated seed and old, unsterilized canvas was used, and in 90% of the beds where untreated seed and old, unsterilized canvas was used. The severity was greater as a rule in the latter two groups, most of the cases in the first group being trace only. The advantage of seed treatment and plant bed sanitation are quite evident. (Fromme, August 1).

North Carolina: Several severe cases reported in Lee County, and found scattering elsewhere. (Foster, August 1).

Bacterial wilt caused by Bacterium solanacearum

Virginia: Granville wilt reported from Patrick, Pittsylvania, Charlotte, and

Mecklenburg Counties. More complaints than in previous years. This may be due to the fact that farmers are paying more attention to the crop this year than formerly. (Fromme, August 1).

North Carolina: Most destructive tobacco disease, lands often being abandoned because of its infestation with the wilt organism. Common this year on land grown to tobacco for years, especially in Granville, Vance, Durham, and Wake Counties. (Foster, August 1).

Root knot caused by Heterodera raidiciola.

North Carolina: More serious this year than in previous years, probably because of the long drouth, making the plants succumb to the infestation. Reported to be worst in Lee and Nash Counties. (Foster, August 1).

South Carolina: Present, damage unknown. (Ludwig, August 1).

Mosaic (cause undetermined).

Virginia: Occurs in about 20% of the fields to some extent. Severe in 1-2% of the fields. More prevalent than I have seen it previously. (Fromme, August 1).

North Carolina: Common but not considered serious in comparison with other tobacco troubles. (Foster, August 1).

South Carolina: Present. Extent of injury unknown. (Ludwig, August 1).

Fertilizer injury - This type of injury has been one of the most serious troubles we have had to contend with this year. In several instances entire fields of over a hundred acres have been practically a total loss. The exact conditions causing the trouble are not fully understood, but in a large number of instances it seems that too heavy applications of a highly available nitrogenous fertilizer tends to cause a firing or spotting of the leaf. (Foster, August 1).

Frenching (cause unknown) - reported from North Carolina. "Very common and destructive this year, in several instances whole fields showing it. Especially common in fields where fertilizer is not used." (Foster, August 1).

Lightning injury - reported from Virginia. "Occurred at Beach, Chesterfield County. Most of plants in circular area about 100 feet in diameter affected. About 50% of affected plants dead and many of the remainder will probably not survive till harvest." (Fromme, August 1).

COTTON

Reduced acreage and rather poor condition is expected to lower the cotton production this year to 8,200,000 bales as compared with 13,400,000 bales of 1920, according to the August 1 estimates of the United States Department of Agriculture.

Reports on disease conditions are not in yet from collaborators in the cotton states, but the following note from J. A. Elliott on the newly described "Phoma" disease is of interest at this time.

Phoma blight caused by Phoma sp.

This recently reported cotton disease (Phytopath. 11: 48. 1921) has been found by Elliott in new localities in Arkansas this year. The following statement and map give an idea of the situation:

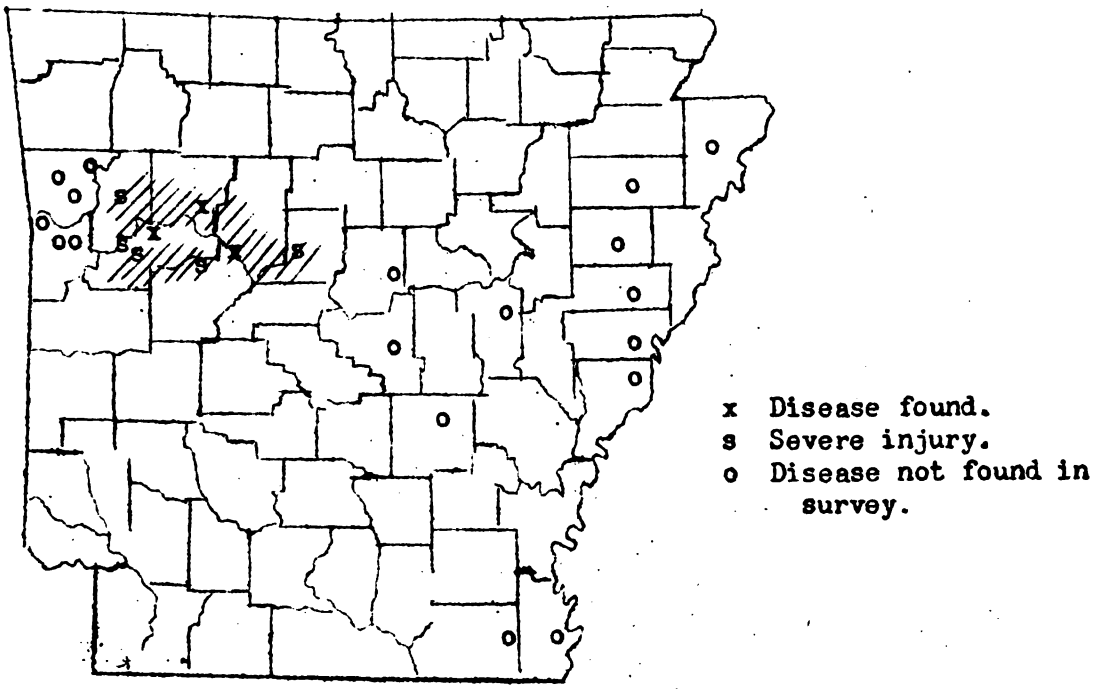

Fig. 1. Distribution of Phoma blight of cotton in Arkansas as determined by surveys up to July 11, 1921.

"The disease so far as we know is limited to the west central part of the state along the Arkansas and Petit Jean River Valleys. It was quite severe in western Conway County in 1915. This was the first known occurrence of the disease.

"Last year, according to reports, the blight was severe in south Franklin, south Logan, and Yell Counties. These reports, I think, are quite authentic. Other reports of damage are rather uncertain, and I imagine are confused with wilt. I did not find the disease this year in any field that had not been in cotton the year previous. This was true on the farms where the disease was severe both this year and last year. The negative reports from the eastern part of the state are not at all conclusive since the season there has been quite dry excepting for a wet period early in the year. The western part of the state received much more rainfall, and conditions were much more favorable for the development of the disease. I rather doubt, however, that the eastern part of the state has ever had a severe attack of this disease."

BEAN

Judging from reports received to date, losses from bean diseases are apparently light, except locally. In Vermont dry weather has prevented the

development of most diseases. The only one reported being stem rot (See also the July 15 and August 1 issues).

Stem rot caused by various fungi.

Vermont: Mr. Gilbert reports considerable in a field at St. Albans. (Lutman, July 15).
Oregon: Present but not serious in the state except perhaps in the hotter sections of eastern and southern Oregon where considerable trouble has been met with in individual places. (Barss, July 1).

Blight caused by Bacterium phaseoli - reported from Oregon. "Cate reports this trouble severe in Jackson County on Kentucky Wonder beans which rarely, he says, come to maturity as a result. One case was observed in Marion County." (Barss, July 1).

Anthracnose caused by Colletotrichum lindemuthianum - reported from Jackson County and the Coast section in Oregon, causing serious loss only in the Coast section, where, however, the acreage is small. (Barss, July 1).

Rust caused by Uromyces appendiculatus - reported from Virginia, West Virginia, and Jackson County, Oregon.

Mosaic (cause undetermined) - reported from Oregon. "Cate reports it general in all sections of Jackson County. Barss finds it general in eastern Oregon, the percentage of infected plants running high. It shows up less than usual in the Willamette Valley up to July 1, but spring has been unusually cool and moist. What will develop later cannot be predicted. (Barss, July 1).

CABBAGE

Temple reports the following diseases on cabbage in Maryland (July 1):

Club root caused by Plasmodiophora brassicae - Picked up, here and there over the state, causing 20% loss to cauliflower growers in western Maryland.

Yellows caused by Fusarium conglutinans - General over the eastern one-half of the state and gradually growing worse. It is, by far, the worst disease of cabbage in Maryland.

Black rot caused by Bacterium campestre - Not much loss from this disease in Maryland.

Black leg caused by Phoma oleracea - About as usual with considerable loss in the trucking sections.

PEA

Blight caused by Ascochyta pisi.

New Jersey: Occasional; no importance. (Cook, July 1).
Delaware: First observed May 21. Very prevalent. More severe on plants weakened by the late frosts than those seeded later. (Manns, July 1).

Maryland: Prevalent and caused more loss than in 1920. Some fields had a loss of as much as 25%. (Temple, July 1).

California: Severe at Pismo; considerable in San Diego County and Los Angeles County; very severe (April 1) in Alameda County. (Milbrath, April 1).

On the San Francisco market I found peas in an unmarketable condition on account of Ascochyta injury. These peas had been grown at Pismo, a new section of 300 acres in San Luis Obispo County. Reports are to the effect that the whole section is affected equally. (Milbrath, April 15 News Notes of the Office of Cotton, Truck, and Forage Crop Disease Investigations, May 7: 5.).

Root rots caused by various organisms.

New Jersey: Abundant throughout the southern part of the state. (Cook, July 1).

Delaware: "Root rot caused by Pythium Debaryanum" was very severe in those fields which have been cropped for a number of years to peas. This root trouble along with the spot disease and late frosts resulted in such poor stands that in many instances the crop was plowed under. (Manns, July 1).

Maryland: Increasing in prevalence and causing considerable loss to the growers of canning-house peas. A limited acreage of late fall or second crop peas is grown here and root rot is very destructive to these. (Temple, July 1).

Downy mildew caused by Peronospora viciae.

Delaware: A trace of this infection was found in one field near Georgetown, Sussex County. (Manns, July 1).

THE PLANT DISEASE BULLETIN

Issued By

THE PLANT DISEASE SURVEY

Volume V Number 5

September 1, 1921

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

Vol. V. September 1, 1921. Number 5

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Brown patch disease of turf caused by Rhizoctonia reported by Piper and Oakley. (Page 76). Collaborators and others are urged to make observations on this disease and report occurrences to this office.

Late blight of potato appearing to some extent in the Appalachian Mountain region from North Carolina to southern New York, but in general it does not seem to be menacing owing to the hot dry season. (Page 77).

More peanut rust in Florida reported by collaborator O. F. Burger. (Page 88).

PLANT DISEASES IN ENGLAND - 1921

The following interesting report of plant disease conditions in the British Isles this year has been received from Dr. A. D. Cotton, Myoologist with the Ministry of Agriculture and Fisheries of Great Britian, July 28, 1921. Collaborators will note that the conditions he reports are not unlike those that we are experiencing in the United States this season.

"This season we have had a very unusual drought, having had no general rain since about May 1 and only a very short allowance since February. As a result certain fungi have not put in an appearance at all, the weather either being too dry for them to flourish or the crops ripening off suddenly before they effected a footing. In cereals, for instance, Yellow Rust was bad in April and May, but our late rusts, P. triticina and P. simplex (on barley) hardly showed at all. Our Black Rust outbreak in Wales will probably also be slight, as crops everywhere are ripening fast. In fruit the very slight amount of apple Scab is striking and many vegetables have died off prematurely and practically no plants or seeds have been set out since June.

"In potatoes we have had no records at all of Blight (last year it commenced in April) and as far Wart disease the soil seems too hot and dry for it to show up in the immunity tests at Ormskirk."

CEREAL AND FORAGE CROPS.

OATS

The yield and quality of oats this year was low in most states. The August forcast indicates a production of only 1,137,000,000 bushels as compared with 1,433,000,000 bushels, the 1915-19 average. The condition on that date was reported as 64.5% while the August 10-year average is 81.6%. Drought and heat are said to be responsible for the deterioration.

Smut caused by Ustilago avenae and U. levis.

Vermont: The county agent made a survey of 52 fields in this, Chittenden County, and found that on native seed, the smut this year was a little less than last, being 2-3%, while on western grown seed it was between 5 and 10% with one maximum of about 20%. He is starting a campaign for homegrown seed. What happens to smut in our Vermont winters? Suggestion to others in the north. Oats all harvested by August 10. (Lutman, August 1).

Massachusetts: About the usual amount. (Osmun, August 15).

Connecticut: No complaint. Probably the usual amount. (Clinton, August 15).

Delaware: June 11, common in all fields. (Adams, July 15).

Pennsylvania: Counts of 163 fields in the following counties show less than 1%: Blair, Cambria, Carbon, Center, Cumberland, Dauphin, Franklin, Schuykill, York, Union. Seed treatment for oat smut is quite generally practiced. (Thurston, August 15).

Ohio: Smut has been rather less evident than in the average season and this appears to be referable to more general treatment of seed oats to prevent smut. The failure of the oat crop to develop normally has caused great disappointment to oat growers and probably has led to reduced attention to disease in the crop. (Selby, August 15).

Wisconsin: Less than usual. Highest amount seed was in Adams County, 14%. (Vaughan, August 15).

North Dakota: Loose smut not abundant this year, only found evidence in the head in special fields. This probably due to intense hot weather at heading time. (Bolley, August 15).

South Dakota: Slight damage. Present in 10% of fields. (Evans, August 15).

Colorado: Both of these smuts are prevalent over the state, but the loose is most prevalent. Some fields were seen where the damage would be about 3%, and from that to just a trace. (Learn, July 15).

Stem rust caused by Puccinia graminis.

Vermont: Much less than I have ever seen here. Hardly 5-10% on the rust scale. The very dry weather of the entire growing season seems to have prevented all but a very slight infection. In other parts of the state there is probably more, but the rain this summer has been in the form of heavy showers instead of long rains, so I should expect that the infection from rusts is light over the entire state. (Lutman, August 1).

Florida: The rust of oats was especially prevalent in the northern part of the state. The spring was hot and dry. (Burger, July 1).

Wisconsin: Crown rust and black stem rust were both more prevalent than usual this year. Losses were considerable, especially on late planted fields. The losses from rusts were closely associated with hot weather injury.

South Dakota: In practically every field. Damage 5% in state. (Evans, August 15).

Colorado: No report has been received thus far and the "barberry scouts" inform me they have not found it on oats in a single instance. (Learn, July 15).

Blast (cause undetermined).

North Dakota: Rather uniformly distributed throughout the state this year. Evidence is rather good that it is associated with intensily hot weather just at the period when the oat is being pollinated in the sheath. No definite indication of specific disease. (Bolley, August 15).

Wisconsin: The hot weather of late June and early July was an important factor in knocking out the Wisconsin oat crop. Many fields have been cut for hay and all grain is very light. (Vaughan, August 15).

Ohio: Drouth injury and break down has been the most conspicuous feature of oat seedings in Ohio for 1921. The crop estimate for the season shows very disappointing return and the yields are so low that the grain is light and unsatisfactory. (Selby, August 15).

BARLEY

Loose and covered smuts caused by Ustilago nuda and U. hordei.

Table 1. Occurrence of loose and covered smuts of barley as reported by collaborators August 1.

State	Collaborator	Loose smut	Covered smut
Illinois	Geo. H. Dungan	Trace	Trace
Wisconsin	R. E. Vaughan	Less than usual	Less than usual.
South Dakota	A. T. Evans	1% damage	Slight.
Colorado	C. D. Learn	Not serious	Several reports.
Idaho	C. W. Hungerford		Trace
Washington	F. D. Heald	No records of occurrence	As usual

Stem rust caused by Puccinia graminis.

New York: Infection considerably heavier than on wheat. (Kirby, August 1).
Illinois: About 5%. (Dungan, August 1).
Wisconsin: Widespread; destructive on some late planted fields. (Vaughan, August 1).
South Dakota: Common; 2% damage. (Evans, August 1).

Stripe caused by Helminthosporium gramineum.

Illinois: Not known to what extent stripe occurred in northern Illinois in 1921, but this disease was present on one variety at the Urbana Station this summer. It is safe to mark "trace" for this disease, in absence of more information. (Dungan, August 1).
Wisconsin: Only a trace found. Much less than usual. (Vaughan, August 1).
South Dakota: Fairly common; 2% loss. (Evans, August 1).
Colorado: This was found in several fields, but in no case was it serious. A strain has been developed at the station which is the most susceptible variety they have. (Learn, August 1).
Montana: More or less infection in nearly all fields. No economic damage. (Jennison, August 1).
Idaho: Trace to 1% found in a few fields of irrigated barley. (Hungerford, August 1).

Scald caused by Rhynchosporium graminicola.

Idaho: Scald was bad on Wisconsin No. 579 on the College Farm, at Moscow. Comparative infection of four varieties as follows: Wisconsin No. 579 65%, Tennessee Winter 15%, Michigan Winter 15%, and White Winter 15%. (Hungerford, August 1).

Climatic injury.

Wisconsin: Hot dry weather very destructive. Grain did not mature well. (Vaughan, August 1).

RED CLOVER

A number of collaborators have reported on the red clover disease situation this year and some of these reports, which are given below, indicate that diseases are rather important in the failure of this crop. Readers are asked to make further contributions concerning the diseases of this important hay and rotation crop.

The Red Clover Situation in Pennsylvania.

"The red clover crop has generally been a failure in Pennsylvania this year. Thousands of acres were frozen during the early freeze which also hit the fruit crop severely. In general the eastern part of the state was most severely hit, the western part next hardest, and the mountainous section running from the northeast to southwest through the center of the state, is least affected though many fields were failures even in this district. Alfalfa also suffered severely and crimson clover wherever it is grown. White clover proved hardy.

"This is the first time in my connection with Pennsylvania (nine years) that red clover has been seriously damaged by frost. It is quite evident that the weather in April brought the clover along too rapidly and made it susceptible to the freezes in May. So far as we can determine diseases did not play any important part in this year's loss to this crop.

"Generally speaking the diseases of red clover are moderately destructive in Pennsylvania. Anthracnose (*Gloeosporium caulivorum*) is usually present in most fields and it is not uncommon to find it killing the stems of 5% of the plants. Sooty-fungus (*Polythrincum*) is always present but apparently does not cause serious loss. Leaf-spot (*Pseudopezizal* is also generally prevalent and may cause 1-2% loss. Root rots have not been serious, though *Sclerotinia trifoliorum* has been found locally in the state. The large-leaf spot (*Macrosporium sarciniforme*) is quite generally prevalent but I do not think it is very destructive as a rule. Mosaic may be serious at times. It was especially prevalent in 1920. I have not noted as much of it this season." C. R. Orton.

Root rot in Ohio.

"Root rot has been reported as causing severe loss in that part of Ohio immediately to the southeast of Columbus. The men state that whole fields have died out, the trouble being most noticed at cutting time and after. Plants affected have the roots rotted entirely away.

"Control measures have not been worked out, but it has been observed that mammoth and alsike clover are much less affected than is red clover." E. E. Clayton.

Clover Diseases in North Carolina.

"Clover, like many of the other crops in the state, was severely damaged early in the spring by several killing frosts and for that reason the information herein given must be based on these conditions; namely, stunted plants damaged by frost, and a cold damp season followed by frequent rains.

"Red clover is the principal legume hay crop of the mountain and Piedmont section of the state; red clover being more common in the mountains and crimson clover in the Piedmont section. In the eastern counties the soy bean replaces the clover to a certain extent, also does the peanut.

"Diseases certainly play an important part in failure of the clover, but evidently crimson clover is more susceptible to diseases than red clover. It may be possible tho that we have received more complaints of injury to crimson than red clover since we are nearer to the crimson clover section. I should say that by far the most destructive disease of both red and crimson clover is the Sclerotinia wilt, this being reported from nearly every section of the state where clover is grown. It is also destructive to alfalfa. Occasionally Sclerotium wilt is reported on clover; also on peanuts and soy beans.

"Estimates of loss in individual instances have been noted and Sclerotinia wilt has frequently caused the grower to abandon the growing of clover and alfalfa. On the Station farm near West Raleigh, there is one such field which was cropped to clover continually for several years until the wilt caused its death every year and the growth of clover was discontinued. In another instance a field of clover and alfalfa in Durham County was so badly infested with Sclerotinia wilt it was grown to other crops.

"Anthracnose (Colletotrichum trifolii) and Pseudopeziza trifolii leaf spots are not considered to be destructive in this state. The two most common and destructive leaf spots are rust (Uromyces trifolii), and sooty spot (Polythrincium trifoliorum). These two diseases are very common over the entire state, and especially on red clover, one causing about as much damage as the other." H. C. Foster.

Diseases of Red Clover in Louisiana.

"The red clover is not a very important crop in Louisiana. This is due to the fact that it has to be grown as an annual. It dies out during the hot summer months. How much of this dying out is due to various root rots has never been determined. There is reason to suspect that Rhizoctonia and possibly other fungi have something to do with this. Sclerotinia trifoliorum has never been reported in Louisiana.

"There are various leaf spots which have not been investigated very closely. From general observations, it would appear that a Macrosporium is the most common and most serious. It is not uncommon to see the plants badly defoliated by those. The clover rust occurs occasionally, but is not very important. I have not seen Pseudopeziza trifolii to recognize it in this state.

"The anthracnoses are not common. The legume anthracnoses need working over. There are a number of those forms which to me seem different. They occur on Melilotus and bur clover and may go to the red clover where this plant is grown on any scale." C. W. Edgerton.

GRASSES

Brown patch of turf caused by Rhizoctonia solani.

A disease of grass especially destructive in lawns and golf courses has been studied and recently described by C. V. Piper and R. A. Oakley, Office of Forage Crop Investigations (Piper, C. V. and Oakley, R. A. The brown patch fungus disease. Golf Illustrated, Vol. 11. December 1918. Piper, C. V. and Coe, H. S. Rhizoctonia in lawns and pastures. Phytopath. 9: 89-92. February 1919. Piper, C. V. and Oakley, R. A. The brown-patch disease of turf. Bull. Green Sect. U. S. Golf Assoc. 1: 112-115. June 1921).

The following note regarding the occurrence of the disease this year and giving data concerning the lawn plants affected has been furnished by the former of these two authors.

> "The brown-patch disease of turf caused by Rhizoctonia solani has been extremely abundant this year, first appearing at Washington about July 10, but at St. Louis it appeared in the end of May. On some golf courses whole putting greens have been turned brown by the disease. The lawn plants most seriously affected are species of bent (Agrostis), Yellow oat-grass (Trisetum flavescens), rough-stalked bluegrass (Poa trivialis), mouse-ear chickweed (Cerastium), Veronica serpyllifolia, and red fescue (Festuca rubra). Immune species are white clover, Kentucky bluegrass, crab grass, and Bermuda grass."

In order that readers may have before them a short description of the disease an extract from the article referred to above in Golf Illustrated is here quoted. Reports of any observations that readers may make on this disease will be very much appreciated.

> "The "brown patch" disease of turf, frequently mistaken for "sun scald", occurs generally in lawns and pastures from Maine to Minnesota and south at least to Virginia. As the fungus is found on other plants all over the United States, it may be expected to occur generally in fine turf composed of susceptible grasses. The disease appears first in hot moist weather of summer and is most rampant when the weather is hot and muggy and on ground that is kept too moist by insufficient drainage or otherwise. The spots are at first more or less circular and grow in centrifugal fashipn, becoming a foot or more in diameter. In early morning many of the spots are covered with a fine mildew-like mycelium. Later in the day the border of actively growing spots is smoky green in color where the grass leaves are dying. When the disease is abundant and the spots merge, in very bad cases, a whole putting green will be completely brown and appear as if dead. With the advent of cool weather in fall most of the spots recover and the grass seems to have suffered no permanent injury. Occasional spots, however, are completely killed."

FRUIT CROPS

PEACH

Brown rot caused by Sclerotinia cinerea.

A few reports of damage from brown rot have been received from some of the northeastern states which have more or less of a crop this year in spite of the freezing weather of last spring.

Massachusetts: On the increase since the wet period of early August; rather serious. (Osmun, August 15).
Connecticut: More or less rotting of early varieties. At least an average year. (Clinton, August 15).
Pennsylvania: Appears to be severe again this year where there is any fruit. (Thurston, August 15).

VEGETABLE AND FIELD CROPS

POTATO

Late blight caused by Phytophthora infestans

The only states where blight of late potatoes has appeared thus far this season are North Carolina, West Virginia, Maryland, Pennsylvania, and New York in the East and California in the West. In these eastern states it is confined to the higher altitudes at the present time. In general, dry, hot weather has retarded and in some places killed out the fungus so that it is later and less prevalent than usual. With average weather during September the disease should not become serious except, perhaps, locally in parts of West Virginia and Pennsylvania where it is well established.

New York: (Bath, Steuben County) Late blight on potatoes was first observed on the edge of the field in which the dusting experiments are being carried on. No blight was observed on the experimental plots themselves. (K. H. Fernow, August 15).
Pennsylvania: Will be prevalent again this year on unsprayed fields of late potatoes except in southeastern part of state. Present now (August 20) in the following counties: Somerset, Elk, Fayette, Cambria, Center, Susquehana, Crawford, Lehigh, and Potter. (Thurston, August 1).
West Virginia: Prevalent upon late potatoes. Spraying experiments are already (August 15) showing very good control with home-made 5-5-50 Bordeaux. (Giddings, August 1).
Florida: The disease was present but on account of dry weather it did little damage. (Burger, July 1).
Washington: No reports have been received during the growing season but the disease is known to be present in the coast counties of western Washington. Specimens of late blight rot of tubers were received just before planting season. (Heald, August 1).

California: July 30 received specimens of plants affected severely with late blight from Humboldt County. About 400 acres of potatoes in this county of which about 150 are affected. It seems that this disease is found in Humboldt County region of the state and does not develop readily elsewhere. (Milbrath, August 1).

Early blight caused by Macrosporium solani.

Vermont: Common as an accompaniment or accomplice of tip-burn. Especially bad on early varieties but some fields of late varieties are almost dead from it. Quite an appreciable loss from it. (Lutman, August 27)
Massachusetts: Relatively little of this disease. Not as serious as usual. (Osmun, August 1).
Connecticut: No complaints yet. Collected or seen somewhat, but not serious in any case. (Clinton, August 1).
Delaware: Prevalent on early crops. Sprayed and dusted plants showed good control. Flea beetle very severe this season and early blight more prevalent on such plants. In many cases only about 70% growth of plants developed. (Adams, August 1).
Pennsylvania: Prevalent together with tip-burn, on early potatoes throughout the state and late potatoes in the eastern and southern sections. Loss in some sections heavy, particularly on unsprayed fields. (Thurston, August 1).
West Virginia: Quite general and more destructive than usual. Reported from Tucker County as causing serious loss. (Giddings, August 1).
Florida: This disease was present but did no severe damage. (Burger, July 1)
Wisconsin: Small amount this year, less than usual. Observed in a field of Green Mountains in Oneida County showing lower leaves one-fourth spotted. (Vaughan, August 1).
South Dakota: Common but did little damage. 10% in many fields. 2% damage. (Evans, August 1).
Idaho: Present in many fields but not serious. (Hungerford, August 1).
California: General throughout state. All plants affected slightly in southern California spring crop. In Delta region, general, all plants have spots on leaves. (Milbrath, August 1).

Mosaic (cause unknown).

Vermont: Apparently less than last year but this loss is undoubtedly deceptive as it was very difficult to diagnose with the extreme hot weather. Since it has become cooler, some fields that were apparently free from mosaic are showing it. (Lutman, August 27).
New Hampshire: Not nearly as abundant as last year. (Butler, August 1).
Massachusetts: Generally in fields planted with home-grown stock. Very severe in some cases, but generally not important where selected northern grown seed was used. (Osmun, August 1).
Connecticut: Probably less than usual. (Clinton, August 1).
Florida: Mosaic was prevalent in the Hastings section. In one field of 27 acres the yield was cut to about 20 barrels per acre. The seed came from Maine and was said to be certified. (Burger, July 1).
Arkansas: Very severe - as much as 70% of some fields are attacked. (Rosen, August 1).
Wisconsin: Much less than last year. There is also a remarkable scarcity of aphis. Triumph most severely injured as usual, one field Barron County

showed over 20% August 5. Disease much less noticeable in northeast sections of state. (Vaughan, August 1).

South Dakota: Did not see any except in experimental work. (Evans, August 1).

Colorado: This has been reported as quite prevalent in one section, but early to get definite reports. (Learn, August 1).

Montana: Probably most common and widespread of any of the diseases of potato found in Montana. Worse in Triumphs than any other variety. Significant control had by better growers and others who are using and growing certified stock. (Jennison, August 15).

Idaho: Potato mosaic is becoming of increasing importance each year in Idaho. Especially bad in northern Idaho this year. (Hungerford, August 1).

Washington: Present but extent is not known. (Heald, August 1).

California: Delta or Stockton, 3% average loss in eight fields examined. Southern California, spring crop 8% average infection, severe. (Milbrath, August 1).

Leaf roll (cause unknown).

Vermont: Would average a little more than last year but not over 5% of the entire plants of the state as an estimate. (Lutman, August 27).

New Hampshire: More abundant than last year. (Butler, August 1).

Connecticut: More or less seen but apparently of the dry weather type. (Clinton, August 1).

Massachusetts: Frequent and serious especially in fields planted with home-grown seed. (Osmun, August 1).

Pennsylvania: Continues to be our most important tuber-born disease. Field counts as high as 100% are frequent. (Thurston, August 1).

Indiana: Very serious in Lake County. (Gardner, August 1).

Wisconsin: No cases observed. (Vaughan, August 1).

South Dakota: Trace. (Evans, August 1).

Colorado: No report has been received thus far. (Learn, August 1).

Idaho: Fairly common in northern Idaho. (Hungerford, August 1).

Washington: Present, but extent not known. (Heald, August 1).

Fusarium wilt caused by Fusarium sp.

Vermont: Professor Gilbert reports occasional pronounced and severe cases. It has been unimportant for a number of years. (Lutman, August 27).

North Carolina: Found this year in the early crop and also the late crop in the mountains. Most destructive in the early crop. (Foster, August 1).

Indiana: Not a factor in the early crop. Already appearing in the late crop, even where seed was carefully sorted and cut to eliminate all tubers showing vascular discoloration. (Gardner, August 1).

Montana: Just beginning to manifest itself. Worse in certain districts than in others. Usual amount of damage expected. (Jennison, August 15).

California: Delta region - Evidence of several species active on basal stem and roots. Range of loss 10-70%. Average loss 15%. Delta acreage about 38,000 acres, main summer crop. (Milbrath, August 1).

Rhizoctonia caused by Rhizoctonia sp.

Vermont: Scattering throughout the state, but the attacks are not bad. (Lutman, August 27).

Indiana: Rather serious in the early crop. Attack comes early in the season and caused stunted plants or blanks in the rows. Typical lesions on the underground parts. (Gardner, August 1).

Colorado: This disease is quite prevalent in the potato section, especially the eastern. It is reported as serious in some fields in this section. It is also present on the western slope. (Learn, August 1).

Idaho: More destructive than usual in all-potato sections of the state. (Hungerford August 1).

California: Very severe in Delta region. Lesions on basal stems and stolons prominent. Average loss 5-8%, average infection 70%. (Milbrath, August 1).

Montana: Quite common, especially in certain irrigated districts. Actual damage to crop this year small. (Jennison, August 15).

Washington: More generally reported than any other disease. It appears to have caused more loss than usual, especially in eastern Washington, since there has been a shortage of moisture. At this time many late potatoes are nearly dead. (Heald, August 1).

Tip burn and hopper burn.

Vermont: Severe attack, the worst we have ever had and in regions where it is usually very rare. This is not hopper injury as leaf hoppers are rare. With diligent search two or three per plant could have been found when the advance of the tip burn was at its height, about July 22. We may now have 25% per plant in Burlington, but the advance of the tip burn has practically ceased. Locally, the plants lost 50% of their foliage. In general, for the state, would estimate about 15%. (Lutman, August 27).

Connecticut: Next to prematuring, tip burn has been the most conspicuous potato trouble of the year. Due to quite variable weather, rainy days followed by bright, hot ones and unusual hot weather as a whole. (Clinton, August 1).

Massachusetts: General on early varieties and unsprayed fields. Green Mountains not seriously affected; Dibble's Russet practically not at all. (Osmun, August 1).

Ohio: Widespread and severe. Apparently no potato patches free. (Detmers, September 1).

Indiana: Very severe on early crop. (Gardner, August 1).

South Dakota: Very abundant. Killed vines in some cases. Has done great amount of damage in South Dakota, probably 15%. (Evans, August 1).

Prematuring.

The intense heat that has been experienced this summer was very detrimental to potatoes in those parts of the country where the higher temperatures obtained. The resulting injury, together with that from drought has been a most important factor in greatly reducing the prospects for a good crop.

Connecticut: The most serious trouble of potatoes so far was prematuring of early planted early varieties, especially those planted on light and leachy soils. The dry weather of June was too much for these fields coming at a time when tubers were forming rapidly. The rains of the last of June failed to save such fields, especially in New Haven County, and the vines went down suddenly as if by disease. The most badly injured fields had only half a crop. Late planted and late varieties not injured. (Clinton, August 1).

New Jersey: Season exceptionally dry, 60% of average yield. (Cook, September 1.)
Wisconsin: Intense heat and drought in June and July caused great injury to stand. Some fields that were planted shallow in mid-June have been abandoned, others half a stand. (Vaughan, August 1).

TOMATO

Leaf blight caused by Septoria lycopersici.

Massachusetts: Only one report. Causing serious injury in a single garden in Amherst. (Osmun, August 15).
Delaware: First reported August 10. Very prevalent in all fields. Serious infections locally where rainfall has been heavy. (Adams, August 15).
Virginia: General and severe as usual. (Fromme, August 15).
New Jersey: Abundant on early market crop. Just starting on canning house crop. (Cook, August 15).
Pennsylvania: Reports now coming in indicate that Septoria is very prevalent this year. Several severe cases have been noticed in Center County, Yield apparently not greatly reduced so far. (Thurston, August 15).
West Virginia: Particularly severe in the central and southern part of the state. (Giddings, August 15).
North Carolina: Common but not destructive this year. (Foster, August 15).
Kentucky: Not severe this season because of protracted drought. (Valleau, August 15).
Ohio: Leaf spot showed about normal beginnings of development where there were showers, but owing to dying of tomato plants from other causes, leaf spot diminished in development. For the later period, doubtless most plantings to the southward would be practically dead before the season of most severe leaf spot attack. The disease is generally prevalent in the southern part of the state. (Selby, August 15).
Arkansas: Very heavy infections during first half of growing period, possibly associated with the cool weather prevalent through April, May, and the beginning of June. (Rosen, August 15).
Texas: Very prevalent, 4% loss. (Taubenhaus, July 15).

Fusarium wilt caused by Fusarium lycopersici.

New Jersey: Present this year, area increasing. (Cook, August 15).
Delaware: First report July 15. Not prevalent in what few commercial fields set out this season. Generally prevalent in garden stands. (Adams, August 15).
Virginia: Reported from two home gardens in Lynchburg, (Fromme, August 15).
West Virginia: Quite general but only occasionally causing serious injury. (Giddings, August 15).
North Carolina: The most common and destructive disease on tomatoes in this state, being found wherever they are grown. (Foster, August 15).
Kentucky: Present, but extent of injury not known. (Valleau, August 15).
Ohio: This has developed in about normal seriousness and has evidently extended by infection of plants in beds and in new areas of infection. It appears that the wilt is increasing in seriousness and is nearing the condition which will require growing of plants in soil of beds or greenhouses

sterilized by some efficient method. The tomato crop of the season is under the average amount and has been marked by serious check and losses in the southern districts from other causes which have obscured the wilt disease. The Department of Botany is continuing its testing and breeding of Fusarium resistant strains of tomato. The success for the past season has been encouraging and gives promise of final strains which will grow in infected soil. (Selby, August 15)

Texas: Epidemic form especially in small gardens and back yards, 1% total loss for state. (Taubenhaus, July 15).

Bacterial blight caused by Bacillus solanacearum.

Virginia: Two reports to date - Oceana (Princess Anne County) and Galax (Carrol County). Severe injury in both cases. (Fromme, August 15).

North Carolina: Destructive in several counties this year and has been reported from the mountains to the edge of the coastal plains where this joins the Piedmont section. (Foster, August 15).

Florida: There was a slight amount throughout the state. In some fields around Gainesville there was a complete loss. (Burger, July 15).

Ohio: Has been reported rather less frequently than in previous seasons, while present to a limited extent in nearly all greenhouses where tomatoes are grown, it is less serious in general in the field plantings. (Selby, August 15).

Texas: Trace. Unimportant. (Taubenhaus, July 15).

Late blight caused by Phytophthora infestans.

As compared with last year tomato late blight seems to be rare thus far this season in the Appalachian Mountain districts from Maryland southward where it usually occurs. The scarcity of the disease is doubtless largely accounted for by the hot and somewhat dry season.

West Virginia: Not so prevalent and destructive as in 1920. It is, however, causing considerable injury in several sections. Reported only from the higher altitudes. (Giddings, August 15).

North Carolina: Very destructive in the mountain section when grown at elevation of above three thousand feet. (Foster, August 15).

Early blight caused by Macrosporium solani.

Massachusetts: Widespread and serious, causing much defoliation; rotting of fruit not observed. (Osmun, August 15).

Connecticut: No damage. Seen only in small amounts. (Clinton, August 15).

Delaware: First observed July 15. Very prevalent and in southern sections many fields seriously infected. (Adams, August 15).

New Jersey: Prevalent, not severe as yet. (Cook, August 15).

Virginia: Moderate in gardens at Blacksburg. (Fromme, August 15).

West Virginia: Quite general but very destructive in the Ohio Valley and western part of the state. (Giddings, August 15).

North Carolina: Common but not as destructive this year as in previous years, because of the dry season. (Foster, August 15).

Ohio: Early blight has appeared upon field tomatoes generally and has shown considerable development in the districts having moderate rainfall. These have been rather restricted portions of the state. In the larger portions it took on more often the form of dying of leaves from the margin ascribed more commonly to drouth. Apparently more referable to tipburn than to early blight. (Selby, August 15).

Florida: There was considerable amount of this disease and especially the nail-head rust. The disease was worse along the lower east coast. (Burger, July 15).

Texas: Very prevalent, 1% loss. (Taubenhaus, July 15).

Western Yellow blight (cause uncertain).

Idaho: The last two weeks of hot dry weather have been especially favorable for the development of this disease. Losses this year will evidently equal or exceed those of last year. (Hungerford, August 15).

Oregon: This disease is reported to be causing close to 50% loss in the region of The Dalles which is the main tomato growing area of the state. It is the one chief limiting factor to the successful production of tomatoes in that region. (McKay, August 15).

Washington: This disease is appearing with its usual severity in various parts of the state. (Dana, August 15).

Blossom end rot (non-parasitic).

Ohio: The collapse of early crops of tomatoes in southern Ohio from drouth breakdown has been most marked. In the Marietta district where the crop is grown by tying to sticks driven in the ground to permit cultivation and free passage through the rows the loss has been the most serious observed in several years. The ground is naturally sandy and easily dried out. The combination of the present season with low rainfall and extremely hot weather during July made an almost abrupt termination of the early field tomato crop of that district. The breakdown of the fruit showed, first, by the dying and blackening of more or less circular area at the blossom end. When such fruits reached premature change of color, like ripening, and were sometimes picked with a small spot upon them, secondary rots developed about the black area and the fruits softened by these decays. These became known as "leakers" in the baskets being shipped and brought the shipping season in effect to rather an abrupt end. The tomato vines of the field showed breakdown from this same drouth-high temperature period which was an unprofitable ending to most tomato plantings. Somewhat better results were reported from tomatoes planted at greater distances in which the vines were allowed to spread upon the ground, thus preventing apparently a considerable amount of drying out. (Selby, August 15.)

Idaho: Blossom end rot is becoming quite prevalent on dry land and where there is not enough irrigation water. (Hungerford, August 15).

Mosaic (cause unknown).

Oregon: Tomato mosaic occurred again this year in the greenhouses where it was so damaging last year and caused on the average a reduction of 50% in the

yield. Some beds were so badly damaged as to necessitate removal and replanting. Climatic conditions apparently determine the severity of the disease for tomatoes replanted in the same bed which had given excessive loss from mosaic without soil treatment and exposed to infection from nearby affected plants gave a fair crop. When planted side by side the Globe variety yielded a much better crop of tomatoes than did Bonny Best though both were affected by the disease. No report of the disease on tomatoes grown out of doors. (McKay, August 15).

Bacterial soft rot caused by undetermined bacteria.

Virginia: Bacterial soft rot of fruit causing 50% loss in home gardens at Blacksburg. (Fromme, August 15).

SWEET POTATO

The sweet potato crop as a whole is reported by the Bureau of Markets and Crop Estimates, August 25, as "growing nicely and a good yield is indicated."

Stem rot caused by *Fusarium* spp.

New Jersey: More severe than in 1920. (Cook, August 15).

Delaware: First observed August 10. Generally prevalent, yellowed and wilted vines showing conspicuously in many fields. Five to ten per cent infection. (Adams, August 15).

North Carolina: The most destructive disease of sweet potatoes in this state. This year we have had a large number of complaints from the potato sections mainly because they do not practice any system of seed treatment, selection, or rotation of crops. The loss in some fields will go as high as 50% of the crop. (Foster, August 15).

Florida: This disease showed up with about the same severity as last year. No exact data gathered. Some young plants showed this disease. (Burger, August 15).

Mississippi: Stem rot reports have been received again this season from several counties in various parts of the state. One grower in Lee County reports 30% infection in a field of 15 acres. On the whole, however, the disease has been reduced somewhat by urging the necessity of healthy seed, sanitary measures in the beds, and planting on non-infected land. (Neal, August 15).

Arkansas: Abundant in some localities - particularly bad on some sandy soil fields. (Rosen, August 15).

Black rot caused by *Sphaeronema fimbriatum*.

New Jersey: Abundant. (Cook, August 15).

Delaware: Initial stand in many fields cut down by early infection on sprouts. (Adams, August 15).

North Carolina: Nearly always found where sweet potatoes are grown. Only a few reports of its presence this year. (Foster, August 15).

South Carolina: Present. No data on prevalence or damage. (Ludwig, August 15).
Florida: The disease showed up in all parts of the state. The young plants this spring also showed considerable damage. No exact data on the loss has been ascertained. (Burger, August 15).
Mississippi: Black rot was present again as usual. However, the campaign for healthy seed stock which was conducted by the Experiment Station Extension forces and the State Plant Board earlier in the year has reduced to a surprising degree the amount of infection on the plants. The strict quarantine regulations of the State Plant Board is causing plant growers in and out of the state to make greater efforts to produce healthy plants. (Neal, August 15).
Arkansas: Heavy infection in fields set out with slips from diseased roots. Inspectors report fields where certified seed was used as free from disease. (Rosen, August 15).

Foot rot caused by *Plenodomus destruens*.

North Carolina: Known to be present in the sweet potato section but no definite reports available. (Foster, August 15).
Mississippi: Reported from Lamar and Chickasaw Counties. Damage slight. (Miles, August 15).
Florida: Specimens received. The severity in the state not known. (Burger, August 15).

Soil rot caused by *Cystospora batata*.

Delaware: First observed August 10. Heavy infection on soil planted continuously to sweet potatoes for ten or more years. Plants easily recognized by retarded growth and root system severely crippled. In some fields 100% of stand infected. (Adams, August 15).

Mosaic (cause unknown).

Arkansas: Present in a limited extent in almost every field inspected. (Statement from G. G. Becker, Chief Inspector, Arkansas Plant Board).(Rosen, August 15).

BEAN

Anthracnose caused by *Colletotrichum lindemuthianum*.

Reported on August 15 from Massachusetts, Virginia, West Virginia, North Carolina, Ohio, and Wisconsin. In none of these states was the disease said to be conspicuous and in the majority of them it was indicated that the disease was present in subnormal amounts.

Bacterial blight caused by Bacterium phaseoli.

Blight has been reported this season from a considerable number of states in the east, but in none of these is it said to be especially destructive.

Rust caused by Uromyces appendiculatus.

Rust is well established now in Virginia, West Virginia, and North Carolina on susceptible varieties according to collaborators in those states. Fromme reports that susceptible beans in Virginia are already showing considerable injury. The disease was also reported earlier in the season from Oregon and from Florida where it was common but not serious.

Mosaic (cause undetermined)

Virginia: Slight to moderate at Blacksburg. (Fromme, August 15).
North Carolina: Scattered reports and observations indicate this disease is making a fair headway in the state. (Foster, August 15).
Wisconsin: A few plants have been seen. Of little importance. (Vaughan, August 15).

Stem rot caused by various organisms.

Fusarium and Rhizoctonia were both reported as causing severe injury in a few cases in Massachusetts and several reports of stem rot were received by collaborators in North Carolina and West Virginia.

CANTALOUPE

Bacterial wilt caused by Bacillus tracheiphilus.

Four definite reports of the occurrence of bacterial wilt of this crop have been received.

Virginia: Only one complaint to date, Amelia County, July 16. (Fromme, August 15).
North Carolina: Fairly common and destructive in some sections in the state. (Foster, August 15).
Ohio: Losses this season in Ohio due to the wilt have been very considerable both as regards isolated local plantings and larger commercial enterprises as well. Excellent control, however, has been effected where adequate attention was given to the destruction of insect pests when the presence of both disease and insects are noted in time. As is usually the case, greatest losses have appeared when the plants were about half grown or younger. Comparatively slight evidence of the disease has been noted since the first of August. It is thought that the wilt disease has been fully as severe as last season. (Thomas, August 15).
Ohio: Wilt has been severe and losses heavy. (Clayton, August 15).

Anthracnose caused by Colletotrichum lagenarium.

Reported in the field from North Carolina. A carload of South Carolina honey dew melons arriving in Boston, August 2, showed 6% affected fruit.

Downy mildew caused by Pseudoperonospora cubensis.

Mississippi: Downy mildew was observed by the writer at the South Mississippi Experiment Station, Poplarville, in July. Appeared to be causing defoliation in a field of about three acres. Also observed on College Station farm. (Neal, August 15).

Leaf blight caused by Alternaria brassicae nigrescens,

Delaware: First observed August 9. In early planted fields infection not prevalent till crop was harvested. Fields in which crop is being picked now show heavy infection and will affect sizing up of melons. Control has been secured with Bordeaux mixture and Bordeaux dust. (Adams, August 15).

Fusarium rot caused by Fusarium sp.

This seems to be the most common decay of cantaloupes in transit, as reported by market inspectors thus far this season. Certain carloads of melons from Arkansas, California, Florida, and North Carolina were reported as showing more or less Fusarium.

Fungicide injury.

Delaware: Dusting for insects and leaf blight quite common with growers this season. Considerable burning of vines has been experienced as the result of a coarse application. Some fields appeared as infected with Fusarium wilt fungus. Vines recovered from injury, but the crop was at least two weeks later than usual. (Adams, August 15).

SUGAR CANE

Mosaic or mottling (cause undetermined).

Florida: There is considerable of this disease showing in the crop in the western part of the state. No exact data has been received as to the amount of severity. (Burger, August 15).

Mississippi: Mosaic found present in 111 properties. Properties inspected, about 600. Counties in which inspections have been made, 45. Counties in which infections have been found, 16. Counties in which infections occur at present, 12. List of counties in which infections occur at present: Harrison, George, Greene, Jackson, Lamar, Lauderdale, Marion, Pearl River, Pike, Stone, Hancock, and Warren. (Miles, August 15.

Red rot caused by Colletotrichum falcatum.

Florida: This disease was very severe in the northern part of the state. The yield in many fields has been cut down considerably. Those fields which obtained their seed from the vicinity of Hawthorne show more disease. In the vicinity of Hawthorne the disease is severe. (Burger, August 15).

PEANUT

Rust caused by Puccinia (Uredo) arachidis.

The following statement from O. F. Burger informs us of the collection of peanut rust in November of last year. This case was one where the rust was doing damage and indicates the possibilities of the disease becoming serious under Florida conditions.

"On November 6, 1920, I received specimens of the peanut rust from S. W. Collins, Torrey Island, Florida. He said that there was a 50% loss from a 15 acre field. The seed was obtained from Morehaven, Florida. He also said no other fields were affected."

TOBACCO

Wild fire caused by Bacterium tobacum.

Pennsylvania: Wild fire was first found in Pennsylvania in tobacco seed beds in the vicinity of Lititz, Lancaster County, May 28, 1921. Investigation has proved that it was present in the same locality last year and has undoubtedly been there for some time though unrecognized and not reported. On August 19, 1921 Professor C. R. Orton conducted a survey of Lancaster County and found the disease widespread and generally prevalent throughout the county. A total of 35 farms scattered over the county were investigated and the disease found on all farms but two. These farms represent over 400 acres and about 75 acres were said by Orton to be severely infected, the loss running as high as 60%. Although infection was found in the seed beds it was not noticed in the field until after heavy rains which occurred during the first week in August. (Thurston, August 24).

Ohio: Wild fire is reported as quite generally prevalent and is causing marked injury to the tobacco crop in Clermont County, Some reports have been received of its occurrence in adjacent counties and to a limited extent in the Miami Valley. (Selby, September 1).

Root rot caused by Thielavia basicola.

Ohio: Root rot has been somewhat generally prevalent in the Miami Valley cigar tobacco district where the practice of steaming the soil beds to kill

out the root rot is quite generally followed and has proved successful. A severe drouth prevailed generally in the Miami Valley district, especially over southern Montgomery and Preble Counties, including adjacent districts. This drouth interfered so seriously with transplanting that many of the larger growing plants had to be discarded. Tests of seedlings on untreated bed at Germantown by True Houser, Assistant Botanist, showed marked resistance of the new Montgomery Seedleaf variety to this disease. One or two Spanish sorts are also resistant. Single test of seedling of root rot resistant strain received from Wisconsin showed serious infection by the disease. (Selby, September 1).

Drouth spotting caused by lack of moisture.

Ohio: Recent reports from the Germantown district indicate very marked spotting and drying up of tobacco leaves in this area, following the prolonged drouth. This is locally known as rust, but up to this time no organism of any kind has been developed as infecting these spots. The trouble has been much more serious than in previous seasons. (Selby, September 1).

Mosaic (cause undetermined).

Ohio: Delayed planting and hot dry weather since that time have contributed apparently to reduce the amount of mosaic in tobacco fields. Our data is very restricted. (Selby, September 1).

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CEREAL AND FORAGE CROPS

WHEAT

Ergot caused by *Claviceps purpurea*.

Reports and wheat samples have recently been received from Towner and Ramsey Counties, North Dakota indicating an unusual amount of ergot in the wheat of those sections. Farmers and millers are inquiring as to the consequences of using infested grain for flour or feed and of the utilization of the straw by horses and cattle. Inspection in the Cereal Office at Washington, of a wheat sample from Newville, North Dakota, showed one of the highest percentages of ergot infestation in wheat ever observed by members of that office.

CORN

Smut caused by *Ustilago zeae*.

The outstanding report on corn smut is that which is given below from South Dakota. In that state the disease is exceedingly destructive this year being the worst ever reported to the Survey. No reports from other Plains States are at hand so that the extent of the area involved in the epiphytotic is not known. However, the observations of C. G. Woodbury given below show that the disease is bad in parts of Minnesota and Iowa. In the east, in the Virginias and Carolinas, reports indicate a superabundance of infection, but in a number of other states smut appears to be about normal.

Massachusetts: About the usual amount, not over .5%. (Osmun, September 1).
Connecticut: Seems to be more prevalent than usual. (Clinton, September 1).
New Jersey: Not severe. (Cook, September 1).
Virginia: Seems to be more prevalent than usual but percentage of ears affected is not high. (Fromme, September 1).
North Carolina: Very common and destructive this year. Cases of infection as high as 15% of stalks by actual count. (Foster, September 1).
South Carolina: Infection general and apparently more abundant than usual. One farmer estimated his loss at 5%. (Ludwig, September 1).
Louisiana: Very scattering this season. (Edgerton, September 1).
Ohio: Common throughout state but less abundant than in 1920. (Detmers, September 1).
Wisconsin: A large amount of smut on both sweet and field corn this year. More than has been reported for several years. (Vaughan, September 1).
Minnesota and Iowa: Prof. C. G. Woodbury, recently returned from a trip including Minnesota and Iowa points, reports that he and Mr. Cosgrove, of the Minnesota Valley Canning Company of Le Sueur, Minnesota, found smut doing important damage to sweet corn in the vicinity of Le Sueur, Minnesota, where practically the only sweet corn variety grown is that known as Crosby. The corn smut attack is not uniformly severe, since some fields were found to be clean. In others, however, rather high percentages of infection were noted. In one particular 60-acre field of Crosby sweet

corn they made careful estimates and agreed that there was at least 25% actual loss from smut.

Near Des Moines, Iowa, smut is very prevalent in some fields of sweet corn, apparently more abundant than usual. As in the case of Minnesota, referred to above, other fields were noted that were free from smut. (A. G. Johnson, August 19).

South Dakota: This disease is very widespread and exceedingly severe in South Dakota this year. Many fields run as high as 60-70%, by actual count. Scarcely a field has less than 10%. Where the ear is affected, of course, it is usually a total loss. I feel sure that the loss in corn from smut alone will be 15%. Many farmers have even sold their hogs, anticipating that they will not raise enough corn to feed them. You may gain some knowledge of the prevalence of the severity of this disease when I say that for the past month we have gotten from one to three inquiries in practically every mail from all localities in South Dakota. (Evans, August 20).

Mosaic (cause unknown).

L. O. Kunkel, who has recently reported on a possible causative agent for corn mosaic (Hawaiian Sugar Planters Exp. Sta. Bul. 3, July 9, 1921) has also sent in the following note on the seriousness of the disease in Hawaii (Office of Cotton, Truck, News Notes. August 6, 1921).

"I have been somewhat interested in the mosaic disease of corn during the past year. This disease is much more serious on corn than is the yellow stripe disease of sugar cane. Mosaic under Hawaiian conditions is a dangerous disease. I recently visited one of the corn growing regions on Waui and found mosaic in every field visited. In some places it was doing considerable damage. In one field of several acres I was unable to find a single healthy stalk. I note that mosaic is present on corn in some of the southern states. It is one of the diseases that should be kept under observation. If it should spread to the corn growing regions of the Middle-west and should there become one-half as destructive as it is in Hawaii, it would be a calamity."

Head smut caused by *Sorosporium reilianum*.

Washington: Head smut of corn has been found around Pullman in several fields. I was in one field that had about 20% infection. In some smut samples recently sent in from Outlook, Yakima County, we found one tassel and one ear infected with head smut. This is the first time that head smut has been reported from Yakima. There is considerable corn raised in this part of Yakima County. (Zundel, September 3).

Bacterial wilt caused by *Bacterium stewartii*.

Eight eastern states report that no bacterial wilt has been observed to date. The only affirmative report is one from Fromme in Virginia who states that Golden Bantam at Blacksburg and Roanoke showed the disease more than other varieties and in one case at least the early plantings were more seriously attacked than the late ones.

Brown spot caused by Physoderma zeae-maydis.

South Carolina: General, but varying in abundance. Damage apparently not great. (Ludwig, September 1).

Florida: I have noticed in Alachua County some fields were so badly affected that many stalks were broken off by the wind where the organism had weakened the tissues. The Agent from Duval County reports that the disease is very bad in that county. From Gadsden County, I have the report that the disease is far worse than was at first suspected. A farmer was in the office recently and said that he would have to quit growing corn if the disease could not be controlled. It has been getting steadily worse for the last three years. (Burger, August 16).

Alabama: Whereas last year in the vicinity of Mobile, Alabama certain growers lost their entire corn crop, the season this year has not been so favorable to the development of this disease and the damage from it is practically negligible. (Povah, August 15).

Bacterial stalk rot.

A stalk rot of corn apparently the same as that in Arkansas has been reported by D. C. Neal of Mississippi as follows:

"Specimens of corn were received recently from Pearl River County which appear to be infected with a bacterial stalk rot. The material was cultured and the organism isolated. The host symptoms tally very closely with Rosen's description of the disease in Arkansas. The grower reports 5% loss in a very small planting. He also states that the same trouble was present last year. Investigation of the disease is being continued in order to establish with certainty the exact cause. However, I feel sure that this is the true "nodal-rot" reported in Arkansas by Rosen and later in Louisiana by Edgerton."

RED CLOVER

Powdery mildew caused by Erysiphe sp. (conidial form) has been unusually common in many parts of the East this year. At least reports from New York, New Jersey, Pennsylvania, Maryland, District of Columbia, and Virginia point that way. Any information readers of this bulletin may have throwing further light on destruction, severity, etc. will be appreciated.

FRUIT CROPS

APPLE

Scab caused by Venturia ineaqualis:

The following individual state reports on the apple scab situation are

very much alike as the majority of them emphasize the short apple crop, failure of growers to spray after the spring freezing injury, very heavy foliage infection, and the effect of this on next year's crop.

Massachusetts: Worse this year than usual in all parts of the state. The McIntosh variety is most severely attacked. The first ascospores were discharged April 25, and the last June 13. The heaviest discharge of ascospores was between April 27 and May 4. The pink spray was the most important. (Krout, September 1).

Connecticut: The worst I have ever seen it in the state. Recently, however, it has not spread further. (Clinton, September 1).

New Jersey: Severe in some localities, very little in others. (Cook, September 1).

Delaware: Leaf infection first observed Apr.21 on Staymans, 75% infection on Early Ripe. Leaf infection very prevalent because of neglected spraying. Trees bearing no fruit in many cases received no spray after the pink. Fruit infection generally prevalent. The irregular setting of fruit did not receive consistent protection in early stages of development even where the regular spray schedule was given. (Adams, July 15).

West Virginia: Quite prevalent in most sections of the state. It has not caused very heavy fruit losses in the state this year but it has weakened many trees for production next year and is also producing much infectious material which will likely cause trouble next spring. It has been readily controlled in sprayed orchards and we have had fair success with dust. The general fruit crop is light. (Giddings, September 1).

Virginia: Have had only one complaint of scab on fruit, and have seen but very little fruit generally. Foliage infection was general, however. I am inclined to think that fruit infection, where fruit is found, will be less severe than last year. The presence of scab on fruit will not affect the sale much as almost anything is bringing a good price on local markets. (Fromme, September 1).

South Carolina: Practically no scab in this section. (Ludwig, September 1).

Mississippi: Inquiries and specimens have been received from Jackson, in Hinds County, and Ashland in Benton County. Considerable loss reported. Fruit unsprayed. (Miles, September 1).

Arkansas: Very heavy leaf infections because of lack of spray applications. (Rosen, September 1).

Ohio: The season of 1921 in Ohio has shown more than normal infection from apple scab. While the late freezes destroyed a heavy portion of the crop in southeastern district where scab susceptible varieties are grown to a very large extent, scab infection has extended over practically the whole state. A tendency to quit spraying after the freezing has left many orchards without protection and resulted in very severe infections on both fruit and foliage for the midsummer period. These infections are not so marked in southeastern Ohio, possibly due to high temperatures and light rainfall during the usual period of disease spread. The need for pre-blossom spray of Bordeaux mixture brought out locally in the northern half of the state for 1920 has been exemplified over practically all of the state. Emphasis is laid upon this pre-blossom application of stronger Bordeaux mixture, both for the efficiency in scab control and for its usefulness in orchard sanitation practice. While with good care as to sanitation the applications of lime sulphur have proved satisfactory, where a real problem of scab control is presented we have found no other spray comparable to this in efficiency and certainty. (Selby, September 1).

Ohio: Scab has ruined, at least for market purposes, much of the crop in northern Ohio. The leaves all over the state are heavily infected and since these

leaves are the means by which the disease over-winters, there probably will be heavy infection of the young fruit next spring. This year has shown again that the pink spray is the important one for scab control. One trial comparing Bordeaux and lime sulphur sprays indicated that the Bordeaux was superior. (Clayton, August 15).

Illinois: Very bad on foliage. Late infection bad on account of cool August. Disease unusually severe due to the fact that few growers continued to spray after the fruit was killed. Defoliation has resulted in many orchards. (Anderson, September 1).

Wisconsin: Less scab than usual. The sprayed orchards of Door County are very free from scab. The frost wiped out the crop in south and southwest portions. (Vaughan, September 1).

North Dakota: Apple scab has not been pronounced and has only been collected once to our knowledge during the year. This specimen was found near Beach in Golden Valley County. (Bolley, September 1).

Montana: More or less common. Considerable damage done in orchards not sprayed. (Jennison, August 15).

Fire blight caused by *Bacillus amylovorus*.

A wide and rather general distribution but not heavy losses are indicated by the accompanying collaborators' reports on fire blight occurrence.

Massachusetts: Very prevalent in certain parts of the state while in other parts not observed. (Krout, September 1).

Connecticut: More prevalent than in average years; bad in a few cases. (Clinton, September 1).

New Jersey: About the usual amount. (Cook, September 1).

Delaware: First observed May 19, on Yellow Transparent. Twig blight is generally prevalent in state on this variety. (Adams, July 15).

West Virginia: Has caused trouble only in occasional orchards and apple trees in town. (Giddings, September 1).

Virginia: Not at all epidemic but a fair sprinkling occurs in the state this year and is occasionally found quite severe. (Fromme, September 1).

South Carolina: A little worse than usual. (Ludwig, September 1).

Tennessee: (East Tennessee) Fire blight of twigs and fruit in a few cases was very damaging. (Sherbakoff, August 11).

Mississippi: Inquiries regarding the disease have been received from eight counties: Smith, Clark, Hinds, Benton, Washington, Marshall, Harrison, and Tippah. More severe on pear, but causing considerable injury to apple. (Miles, September 1).

Louisiana: Very few apples in state but have had a couple of reports of blight. (Edgerton, September 1).

Ohio: The extension of fire blight infection since July 1 has apparently been somewhat restricted and more recent investigations by R. C. Thomas indicate very general and almost immediate infection by black rot, *Sphaeropsis malorum*, following fire blight. Indeed, the later scattering of twigs raises the question as to whether some of this initial invasion and killing of twigs is not to be acredited to Sphaeropsis (See black rot). "Throughout my entire trip I was very much impressed with the amount of twig blight. The organism ostensibly present was the black rot fungus. The question arises as to whether black rot is the primary cause or whether fire blight followed by black rot has been the logical manner of attack."-Thomas. (Selby, September 1).

Ohio: The fire blight attack seems to have been checked materially by the dry weather of the past month. (Clayton, August 15).

Illinois: Very serious in northern sections of state on susceptible varieties. Little damage on account of light crop. (Anderson, September 1).

Wisconsin: More fire blight than for several years. Some large growers have pruned out blighted twigs already and hope to control the spread of infection. (Vaughan, September 1).

North Dakota: Not particularly destructive this year. Dry weather conditions which have prevailed throughout the summer have apparently prevented excessive growth with the result that fire blight has not done the usual amount of damage to apple trees. (Bolley, September 1).

Montana: More common than for two or three years past. From 5-15% damage depending upon varieties and care. (Jennison, August 15).

Washington: Moderate to severe in the White Salmon section. No reports from other parts of the state. (Dana, September 1).

Blotch caused by *Phyllosticta solitaria*.

The blotch situation in Ohio as reported below by A. D. Selby is of especial interest.

Delaware: Canker infection very severe on Duchess in some sections. Fruit and leaf infection first observed June 26. Very severe, as trees received only dormant and pink spray. (Adams, July 15).

Tennessee: Common, East Tennessee. (Sherbakoff, August 11).

Mississippi: Specimens from Terry in Hinds County. Trees not sprayed. Severe injury reported. (Miles, September 1).

Louisiana: Very common and severe on the few apple trees that occur in this state. (Edgerton. September 1).

Ohio: Apple blotch has heretofore been looked upon as a disease prevalent or dangerous only in the southern half or even in the southeastern portion of the state. The season of 1921 has proved the danger of this viewpoint. Under the practice of the omission of pre-blossom or midsummer applications of copper sprays along with the known tendency towards dispersal of spores the disease has advanced practically across the whole of Ohio, while according to the susceptibility of varieties and the conditions as to origin and treatment of trees makes for sharp variations. Investigations since July 1 have brought the blotch invasion northward sharply into view. As reported July 1 specimens have been studied from many additional counties and recent collections in Wayne, Lucas, Ashland, have pointed to the real arrival of this orchard parasite at the northern boundaries of the state. The sharpest illustration has been shown in Lucas County where on August 6 R. C. Thomas investigated certain orchards of the Jonathan variety which had received dust applications. The dusts included both compounds of lime sulphur and those containing dehydrated copper as dust. Mr. Thomas found that 95% of the leaves were infected. Apple scab was everywhere prevalent but apple blotch was the serious leaf parasite. On this variety, Jonathan, little fruit infection was found. The inefficiency of the dusts to control diseases was sharply exhibited. (Selby, September 1).

Illinois: Worse than usual in the few orchards which escaped freeze. This due to failure to spray on account of light crop. (Anderson, September 1).

Black rot caused by Sphaeropsis malorum.

Massachusetts: Black rot very prevalent in most sections of the state. The Baldwin variety most severely attacked. (Krout, September 1).

Delaware: Frog-eye infection very prevalent April 29. Many orchards showed early defoliation the last of July. More prevalent than usual because of neglected spraying. Black rot infection common because of much side worm injury. (Adams, July 15).

Virginia: Foliage conditions of apples is very bad generally, due to frog-eye, dry weather and scab, also cedar rust in some sections. Many complaints of frog-eye have been received. This was anticipated when fruit growers omitted spraying after the frost damage. Injury to next year's crop will no doubt be considerable. (Fromme, September 1).

Ohio: Next to apple scab the infection of apple twigs, leaves and fruit from black rot and blotch over practically the entire state has been the striking feature of the season. Black rot cankers are so much in evidence and the Sphaeropsis malorum so closely follows fire blight or other dying of twigs as to make a real black rot problem. It seems also that where Bordeaux mixture has been omitted in the spray program of the orchards there has been a marked tendency to increased infection of both black rot and blotch. This infection has been so marked, indeed, as to constitute a real menace to apple orchards where the strong fungicides have been omitted in the spraying program. We have been compelled in Ohio to recommend and to practice applications of copper sprays in foliage during midsummer. (See blotch) (Selby, September 1).

Frog eye leaf spot has practically defoliated many unsprayed orchards in southern Ohio. This trouble seems to be most severe in orchards lacking proper fertilization and cultural care. (Clayton, Aug. 15).

Illinois: Frog-eye on foliage serious in southern portion of state and on fruit when present. This is the worst infection experienced in several years. (Anderson, September 1).

Cedar rust caused by Gymnosporangium juniperi-virginianae.

Virginia: Attracting unusual attention in Piedmont section - Amherst, Nelson, and Albemarle Counties. (Fromme, September 1).

West Virginia: Very little injury as reported early. (Giddings, September 1).

Powdery mildew caused by Podosphaera leucotricha.

Delaware: Very severe on one block of Jonathan, April 21. Leaf shoots severely infected. Retarded growth indicates bud infection as described by Fisher. (Adams, July 15).

Tennessee: Powdery mildew was found to be causing apparently a considerable loss near Cleveland. (Sherbakoff, August 11).

California: Observed on apple trees. Considerable defoliation of twigs. The mildew is general in the Pajaro Valley this year, but in spite of this there will be a fair crop of apples harvested as apparently only terminal shoots were defoliated. (Fields, August 22).

Bitter rot caused by Glomerella cingulata.

Bitter rot has been reported from a number of the southern states where there is any crop. More than the usual percentage has been observed in Illinois.

Superficial bark canker caused by Myxosporium corticolum was reported by Krout as very common this year in Massachusetts.

York spot or drought spot was observed in Delaware the first of August in a block of York Imperials, causing 5% injury according to Adams.

Copper injury was reported by Adams of Delaware as causing considerable leaf injury and defoliation in many orchards where Bordeaux spray was used. Williams variety of apple very susceptible to leaf injury. Bordeaux russeting from summer spray very severe on Ben Davis.

Arsenical injury at blossom end and on foliage has been further reported by Selby of Ohio since July 1, thus indicating the need of greater care in the amounts of arsenate of lead employed in the sprays following the calyx cup period.

PEACH

Brown rot caused by Sclerotinia cinerea.

Massachusetts: Observed in a few orchards July 15. There will be a fair crop of peaches in the state, and the damage may be heavy. (Krout, July 1).

Tennessee: (East Tennessee) Brown rot of fruit very serious; brown rot twig blight in some cases causing considerable damage. (Sherbakoff, August 11).

Illinois: No peaches in state this year, so disease not very destructive. Market peaches from Georgia and other southern points have had less than the usual amount of brown rot this season. (Anderson, August 15).

Scab caused by Cladosporium carpophilum.

Scab is said to be present in about the usual amounts in Massachusetts and Connecticut.

Illinois: Market peaches have shown considerable scab, especially those from Texas. Twig infection is worse than usual this year. (Anderson, August 15).

Black spot caused by Bacterium pruni.

Connecticut: A little but no serious damage. Probably more than average years. (Clinton, August 15).

Ohio: Reported in limited amount with rather restricted injury. Growth of late foliage generally good but restriction of crop to the lake and island districts has led to limited interest in peach orchards and their troubles. (Selby, August 15).

Illinois: Very bad on foliage in southern sections of the state. It developed late in the season but will probably reduce the number of fruit buds considerably. (Anderson, August 15).

PEAR

Powdery mildew caused by Podosphaera leucotricha.

An unusual outbreak of powdery mildew on pears in central Washington has been reported by D. F. Fisher of the United States Department of Agriculture. Fisher's report was sent from Wenatchee, Washington, September 8.

> "Very general and severe on Idaho, Anjou, Bartlett, and Louise Bonnie. Less severe on Flemish Beauty and Winter Nelis, latter very resistant. Many Anjou crops reduced 50-75% and remaining fruit badly russeted and scarred. On this variety the scars resemble early scab infection. Idahos often completely covered with russet and greatly stunted in size. All affected pears are reduced in market grade. Fungus makes a sparse growth on foliage and twigs but apparently does not stunt growth or as seriously devitalize the tree as on apples. Affected leaves are russeted on the under side and become cupped or curled and eventually drop. Perithecia have been found on pear fruit but not on twigs.
>
> "This is the first time the disease has been serious or at all widespread on pears even on pear trees interplanted with mildewed apple trees. The fungus was well established before its prevalence was observed, and consequently no control measures were undertaken this year."

VEGETABLE AND FIELD CROPS

POTATO

Late blight caused by Phytophthora infestans.

Late blight is practically absent from New England this year according to several recent reports just received from collaborators and others there. Only traces have been observed in Maine to date so that the probabilities of that important potato state escaping blight damage are exceptionally good. In New Hampshire they have been on the watch for it but none has been seen. However, Gilbert in Vermont has located a couple of inactive infection centers.

In Pennsylvania and the mountain sections farther south where considerable of the disease appeared earlier in the season it has not been making rapid progress owing to hot, dry weather.

Vermont: We have recently observed a little late blight in several isolated sections of the state. In the Connecticut River Valley near Brattleboro, there has been general infection of several fields. In Orange County we have seen light infections in one or two fields. These latter seemed to originate at the time of rains, but, dry weather coming on, the blight was checked and has not progressed since. In the Brattleboro case I believe that the infection has been brought on by the heavy mists which have been prevalent there recently. (Gilbert, September 8).

Massachusetts: Not reported this season. (Osmun, September 1).

Connecticut: Have been unable so far to find a single specimen. (Clinton, Sept. 1).

New Jersey: None. (Cook, September 1).
West Virginia: Quite prevalent in the central, eastern, and south-eastern parts of the state. Aside from Randolph and Tucker Counties the amount of injury is likely to be slight as dry weather has been prevailing recently and has killed out most of the disease. (Giddings, September 1).
Ohio: Apparently none present this year. Weather conditions thus far unfavorable to its development. (Detmers, September 1).
Wisconsin: No cases seen or reported. There is a very heavy vine growth in northern fields of Green Mountains which may develop blight later. (Vaughan, September 1).

Tip-burn (non-parasitic)

Massachusetts: Serious and general especially on early varieties. (Osmun, September 1).
West Virginia: Unusually severe and destructive. Estimated reduction in yield probably more than 30%. Leaf hoppers very abundant and apparently associated. (Giddings, September 1).
Ohio: Tip-burn is causing more damage at present than any other trouble. Between drought and tip-burn, the crops in central and southern Ohio have been practically a failure. In northern Ohio the early potatoes have suffered severely, but the trouble is not yet prevalent on the late crops. Leaf hoppers, which transmit this trouble, are very abundant in the fields of late potatoes. (Clayton, August 15).
North Dakota: Tip-burn rather common. In association with heat during late June and early July, appeared to result in a good deal of destruction. Do not think there is any indication that this disease is particularly associated with the attack of leaf hoppers. No doubt these insects increase the destruction. It seems to be wholly associated with some root trouble which causes the plants to fail to furnish sufficient water to meet the transpiration taking place on the marginal points of the leaf and particularly from the water pores. It is naturally pronounced in its destruction at times when transpiration is excessive and moisture is deficient. (Bolley, September 1).
South Dakota: Tip-burn of potatoes has been exceedingly bad in this state and has done a great deal of harm. The potato crop will be very short, due largely to the drouth, together with severe tip-burn. (Evans, August 20).

Mosaic (cause unknown).

Further reports on potato mosaic have been received as follows:

Massachusetts: Especially noticeable in fields where homegrown seed was planted. In one plot from Maine seed 75%. (Osmun, September 1).
Connecticut: Not very conspicuous this year. (Clinton, September 1).
New Jersey: Less than usual. Five per cent or less. (Cook, September 1).
Wisconsin: Less mosaic than for several years, seems to be associated with lack of aphis to spread infection. Triumph variety continues to show greatest amount of infection. (Vaughan, September 1).

Black leg caused by Bacillus phytophthorus.

Wisconsin: Only three specimens found all summer. No practical damage this year. (Vaughan, September 1).

Montana: Widespread and commonly seen. Next to the mosaic disease it is the most significant disease of the crop in non-irrigated sections. Estimate 2-3% damage to crop. (Jennison, August 15).

Colorado: This disease has been reported as quite prevalent in one potato section. (Learn, August 1).

Early blight caused by Macrosporium solani.

Numerous reports concerning early blight indicate that the disease is of only very slight importance this year.

Stem rot caused by Rhizoctonia solani.

Washington: Rhizoctonia is giving more trouble this year than usual (in Yakima Valley). This is dependent, I find, on two factors, first upon the quality of seed used, and second upon the time of planting. I find that potatoes planted from the latter part of April up to and including the middle of May are diseased ranging as high as 80% Rhizoctonia. Potatoes planted after May 15 and up to and including the fore part of June show very little disease. (Zundel, August 23).

Bacterial wilt caused by Bacillus solanacearum.

Florida: Last spring and winter was warm and the Bacterial wilt was very severe throughout the state. In the Hastings district 85% of the fields were badly infested. Reports from the market showed also that slimy soft rot was present. Bacterial wilt may be a cause of slimy soft rot. Some sprayed fields showed that Bordeaux is able to check this disease. (Burger, July 1).

BEAN

Diseases of bean are apparently of much less importance this year than is usually the case.

Anthracnose caused by Colletotrichum lindemuthianum - reported as unimportant in Tennessee and Wisconsin.

Bacterial blight caused by Bacterium phaseoli - said by Sherbakoff to be common and causing about 5% damage in the vicinity of Chattanooga, Tennessee; also reported from Wisconsin.

Rust caused by Uromyces appendiculatus - reported by Ludwig of South Carolina as fairly common in the Piedmont and adjacent sections. He has received no data as to the susceptibility of varieties except that the White Kentucky Wonder is susceptible to some extent. Sherbakoff reported some rust on bush and pole varieties in the vicinity of Chattanooga, Tennessee; more severe on the latter, the damage was slight.

Mosaic (cause undetermined) - reported as unimportant in Massachusetts and Wisconsin; and by Sherbakoff as affecting about 3% of the plants in the vicinity of Chattanooga, Tennessee.

Stem rot caused by Sclerotinia libertiana - reported locally in the central part of West Virginia. Stem rot caused probably by Fusarium sp. was reported by Sherbakoff as causing about 2% damage in the vicinity of Chattanooga, Tennessee.

RHUBARB

Crown rots caused by Phytophthora spp.

The disease recently described by W. S. Beach (Phytopath. 11: 55-56. 1921) is again common this year in Philadelphia County, Pennsylvania. A similar, but probably not identical disease has just been reported to the Survey by C. D. Sherbakoff of Tennessee. This trouble more closely resembles the disease being studied by Godfrey of the United States Department of Agriculture. Regarding it Sherbakoff says:

> "Rot of leaf stalks and leaf spot of rhubarb caused by a Phytophthora closely resembling Phytophthora terrestris (at the present time the writer is by no means certain of the identity of the two fungi, except that they resemble each other in their gross morphology and in their pathogenicity in regard to rhubarb and tomato). The disease of rhubarb was found on June 25 in a section of the city (Knoxville) known as Island Home, side by side with a tomato field affected with buckeye rot. There are strong indications that this disease of rhubarb is not uncommon in many places around Knoxville and that it is also present in West Tennessee. Nearly three-quarters of the patch of rhubarb where the disease was first found is at present killed by it and the ramaining plants are also threatened."

Collaborators are urged to report any cases of this disease as the geographical distribution of these troubles should be worked out and the relations between these tomato and rhubarb fungi established.

CUCUMBER

Bacterial wilt caused by Bacillus tracheiphilus.

Bacterial wilt is reported as having been severe in Ohio, and, for the first time in several years, in Wisconsin.

Ohio: This wilt has been severe and losses heavy. First observed June 15, central and southern Ohio. (Clayton, August 15).

Wisconsin: Bacterial wilt in Wisconsin was more severe than in any year since 1916. Fields visited through the state averaged 4-6% wilt up to August 25, several fields showing 20-30% of wilted plants. The first season in several years in which B. tracheiphilus has been of serious importance in the state. (Doolittle, September 1).

Mosaic (cause undetermined).

Wisconsin: Mosaic in 1921 did less than 30% of the damage that was suffered from this disease in 1920. Initial infection appeared in July in about the same number of fields as in other seasons but owing to a reduced number of aphids the disease spread with much less rapidity than 1920. Many districts which produced practically no crop as a result of mosaic in 1920 secured a fair crop this year. (Doolittle, September 1).

California: Mosaic in all greenhouses during winter season, January to June. Three per cent loss in plants. Considerable more in fruit. Field condition not determined up to date. (Milbrath, July 15).

Angular leaf spot caused by Bacterium lachrymans.

During the early part of the year this disease caused considerable damage in the cucumber-growing sections of Florida, according to the News Notes of the Office of Cotton, Truck, and Forage Crop Disease Investigations for March 2.

Wisconsin: Angular leaf spot did not appear to any extent in Wisconsin until mid-August owing to continued dry weather. On September 1 the disease was present in about 10% of the fields visited, about 30-50% of the plants in these fields were affected to some extent. No serious losses from the disease. (Doolittle, September 1).

California: July 1, severe on Klondyke variety in San Diego County. Crop at peak of season on this date. Thirty per cent affected severely. (Milbrath, July 15).

Anthracnose caused by Colletotrichum lagenarium - according to Doolittle was noted in only two fields in Wisconsin up to September. Both fields were located near Madison, no serious damage.

Downy mildew caused by Pseudoplasmopara cubensis - reported by Doolittle in two fields at Rockland (Monroe County) in western Wisconsin. Disease just appearing on August 25. This was the first time the disease had been noted in the state for several years.

COTTON

Wilt caused by Fusarium vasinfectum.

Fusarium wilt is causing considerable loss in most cotton-growing states, according to reports received.

North Carolina: The most destructive and widespread disease of cotton in this state, being found in all counties where cotton is grown. (Foster, September 1).

South Carolina: Quite abundant, especially in the lower sections of the state, but is present in the Piedmont as well. (Ludwig, September 1).

Louisiana: Common as usual, and in about the same amount. (Edgerton, September 1).

Mississippi: Present again this season in many parts of the state, especially on sandy loam soils. Damage at least 5% for the state. (Neal, September 1).

Texas: Much dead cotton is seen in fields, due to wilt or root rot, but nearly all of this has fruit upon it. (Bur. Markets & Crop Est. Crop Notes, week ending August 20).

Arkansas: Already killing cotton in some fields. (Elliott, July 1).

Very destructive in some places, scattering infections have been found almost over the entire cotton-growing section of the state. Report of 20% killing of plants in fields of northeastern Arkansas. (Rosen, September 1).

Angular leaf spot caused by Bacterium malvacearum.

Angular leaf spot is said to be the most serious disease of cotton in Arkansas.

South Carolina: Infection heavy in some places and very light in others. In general the infection is light where the weather has been dry, especially if delinted seed was planted. (Ludwig, September 1).

Louisiana: Very common. In some localities has caused considerable shedding of the leaves. (Edgerton, September 1).

Mississippi: Angular leaf spot, while of minor importance over the state at large, has been reported and specimens have been received and identified on August 1 from Lowndes County (Columbus, Mississippi). This particular grower states that the disease is causing 25% damage as a result of a very severe boll infection, resulting in a high percentage of non-matured bolls and low grade cotton. He also states that this car of seed was bought and shipped into the state from South Carolina. (Neal, September 1).

Arkansas: General and severe. Our most serious disease. (Elliott, July 1).

Very general to severe. Initiates 75% of boll rot in this state, also severe on leaves. (Elliott, September 1).

Anthracnose caused by Colletotrichum gossypii.

Except in Louisiana, anthracnose is said to be causing only locally severe damage.

Tennessee: (Vicinity of Chattanooga) Two fields examined; one field slightly affected, damage probably about 3%; the other field severely affected, the damage at present is about 10%, eventually will be amounting to about 20%; the disease is especially conspicuous in the lower parts of the fields. (Sherbakoff, August 11).

North Carolina: Not so common this year except in counties in southeastern part of state. There rainfall has been abundant. (Foster, September 1).

South Carolina: Present. Extent of injury unknown. Infection does not usually develop to its greatest till September. (Ludwig, September 1).

Louisiana: Very common and doing considerable damage. (Edgerton, September 1).

Mississippi: Anthracnose is of minor importance again this season over the state at large. This fact is, no doubt, due to the dry weather which has prevailed during the greater part of the growing season. This is an important disease in the Delta section in periods of abundant rainfall. (Neal, September 1).

Arkansas: Not general but severe in some fields, usually traced to source of seed. (Elliott, September 1).

Malnutrition (non-parasitic).

Tennessee: Some rust reported but no serious damage. (Bureau of Markets and Crop Estimates Crop Notes, week ending August 13).
North Carolina: Found in localities where fertilizers were not used. Several fields found showing typical potash hunger. (Foster, September 1).
South Carolina: Rather more common than usual, owing to the tendency of farmers to use less fertilizer during the money stringency. (Ludwig, September 1).
Louisiana: No reports and have not noticed any around the state. (Edgerton, September 1).
Mississippi: Only a very small amount observed or reported this season. (Neal, September 1).
Arkansas: Common on poor soils. (Elliott, September 1).

Root-knot caused by *Heterodera radicicola*.

Root-knot is commonly reported, but does not appear to be the cause of much damage this season.

North Carolina: Common over entire cotton section of state, but no reports of serious nature this season. (Foster, September 1).
South Carolina: One or two inquiries. Apparently not as serious as wilt, unless associated with the latter. (Ludwig, September 1).
Mississippi: No reports of root-knot this season. Apparently of little economic importance. (Neal, September 1).
Louisiana: No reports. Nematodes do not seem to injure cotton much in Louisiana. (Edgerton, September 1).
Arkansas: Rather common and often severe. (Rosen, September 1).

Black rust caused by *Alternaria* sp.

Arkansas: Completely defoliates some cotton following angular leaf spot, severe in western part of state. (Elliott, September 1).

Leaf spots caused by *Cercospora* sp. and *Ramularia* sp.

South Carolina: In a few places leaf spots are abundant but appear to have followed some weakening, due to soil or weather conditions. (Ludwig, September 1).

Blight (cause unknown).

South Carolina: In July a spot of a few rods extent occurred on a farm in Oconee County. In this area practically every stalk was destroyed. The cause has not yet been determined, but would appear to be fungous in origin. (Ludwig, September 1).

TOBACCO

Angular spot caused by Bacterium angulatum.

Kentucky: Angular leaf spot is widespread over the state but is not causing the serious losses of 1921. Until recently the season has been very dry with very little plant growth. Following the first rains tobacco grew very rapidly, producing a clean leaf. In a few places there has been considerable infection; following heavy rains with wind, in tobacco which is nearly mature. (Valleau, September 1).

Wildfire caused by Bacterium tabacum.

Massachusetts: Very serious in seed-beds and from these it was carried to many fields where from 2-20% was reported. All field infections were traceable to infected seed-beds. (Osmun, September 1).

Connecticut: Wild fire, a new disease in the state last year, did considerable damage. Saw a few fields almost ruined. One farmer lost his entire crop of 21 acres. Generally distributed in the Connecticut Valley north of Hartford. (Clinton, September 1).

Kentucky: Much less prevalent than angular leaf spot and causing comparatively little injury. (Valleau, September 1).

Root rot caused by Thielavia basicola.

Connecticut: Not so injurious as in some seasons, but present and cutting down yields in some fields. (Clinton, September 1).

Kentucky: Tobacco root rot is prevalent throughout the Burley section causing uneven stands. These are considered generally by the growers to result from replanting and variable soil conditions, but in several cases it has been demonstrated through the use of resistant strains that the chief cause is root rot. We are testing five strains of resistant "Stand up" Burley in several sections of the state. During the hot dry summer susceptible tobacco on badly infested ground made very little growth but since the rains and cooler weather of the past two weeks it has grown rapidly. (Valleau, September 1).

Wisconsin: Less damage from Thielavia than in years, due to high soil temperatures. Old infested field at Experiment Station shows only about one-tenth as much injury as in normal seasons, although Thielavia is still doing considerable damage on most susceptible varieties. (J. Johnson, September 1).

Mosaic (cause undetermined)

Leaf spotting caused by mosaic is reported from Kentucky and Wisconsin where the disease is apparently doing more damage than usual. A leaf disease of unknown origin, which is perhaps an unusual form of mosaic, also occurs in Kentucky, according to Valleau.

Massachusetts: About the usual amount. (Osmun, September 1).

Connecticut: Perhaps more common than usual; at least seen in many fields, but rarely very serious. (Clinton, September 1)

Kentucky: Mosaic in Burley tobacco is more prevalent than usual. It is causing damage not only from the dwarfing and loss of weight, etc. caused by typical mosaic, but a death of large areas of the lower leaves of mosaic plants is very common and destructive. This appears first as a speck or spot one-half or two-thirds of the distance from the base of the leaf. The area between the spots gradually dies leaving a large dead area often covering as much as 36 square inches. In its early stages this is often mistaken for angular leaf spot. This has also caused considerable damage in the Dark section. The relationship between this type of injury and mosaic is not generally recognized by the growers.

A disease of tobacco, the cause of which is not known, has been observed for the past two seasons. The later stages appear as dead lines in the leaves, often making very striking patterns. It is common both in Burley tobacco and in the dark district. The early stages appear as light colored lines identical in color with the light areas of mosaic blending into the normal green. These may form a series of small rings or be portions of larger rings thus forming nearly straight lines terminating at large veins. A few leaves in the early stages have been observed completely covered with patterns identical with the so-called Liesegangs rings of the chemist. There is a possibility that this may be one of the manifestations of mosaic but the young growth from plants so affected has shown no signs of mosaic. (Valleau, September 1).

Wisconsin: An unusual amount of mosaic this year, probably on account of high temperatures favoring progress of disease. Mosaic followed by death of parts of leaf, i. e. leaf spotting, called "rust" by farmers but distinguishable from spots caused by known parasites and other non-parasitic spots. (J. Johnson, September 1).

Hawaii: I found mosaic prevalent in South Koua. (Kunkel, L. O. News Notes, Office of Cotton and Truck Disease Investigations, August 6, 1921, page 7).

Leaf wilt (cause unknown).

A leaf wilt of unknown cause has been reported from Kentucky. The Plant Disease Survey would be interested in knowing whether similar troubles have been observed in other states. Regardings symptoms of the disease, Valleau reports as follows:

"A tobacco leaf wilt disease is quite prevalent. It appears sometimes as a wilt of the entire growing plant, the leaves dropping badly but occasionally recovering. In other cases it appears on the larger leaves, generally near the top of the plant, causing a wilt of a portion of the leaf. In this wilted area there are generally large brown spots which give the appearance of cured tobacco. The immediate edge of the brown spot is bordered by a narrow bluish green line and beyond this there may be an area of an inch or more of light yellowish green. The injured areas in such leaves generally do not recover, but eventually dry up including some tissue surrounding the injured portion. It is generally believed by the growers that this injury results from the sting of the stink bug, but they have no evidence of this point. In some fields this disease is causing about .1 of 1% injury. It was noticed last year to some extent, but according to the growers it is very much more prevalent and destructive this year than in any previous year."

Bacterial leaf spot caused by unnamed organisms.

Wisconsin: Symptoms similar to wildfire but less virulent. Not a serious disease in recent years. Probably the old-fashioned rust. Found in several fields but causing no serious damage. (J. Johnson, September 1).

"Streak disease" apparently an undescribed trouble, resembling the streak disease of potato, was reported by L. O. Kunkel (News Notes of the Office of Cotton, Truck, and Forage Crop Disease Investigations, August 6) as the most serious tobacco disease in the vicinity of South Koua in Hawaii.

Lightening injury. A tobacco field about eight miles south of Janesville, Wisconsin was struck by lightening, killing an area of young tobacco about three rods in diameter. Many plants were killed outright; the plants at the edge were partially injured. (J. Johnson, September 1).

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

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Notice to collaborators:
Final Plant Disease Survey report on cereal diseases to be called for by October 15.

CEREAL AND FORAGE CROPS

WHEAT

Ergot caused by *Claviceps purpurea*.

Further valuable data on the wheat ergot outbreak in North Dakota, reported in the last issue of this Bulletin has been supplied by H. L. Bolley:

"This disease has increased extensively under the conditions which have prevailed during the past two or three years. It has

become very destructive in rye and particularly in the durum wheats, even occurring to a marked extent in barley. There are large sections of the State, particularly north and eastward in which rust has not materially damaged the late wheat. The infection from ergot seems to be so matched by the development of the wheat that it was possible for this disease to infect practically every grain in the head, and in many cases more than 50% of the heads, so that crops which were otherwise very promising seemed to be destroyed by ergot in a week. Great quantities of honey-dew like substance exuded from the blossoms and young grain. This exudation was so great that it ran down the stems so as to collect large quantities of dust and dirt to which the flies were quite attracted."

SORGHUM

Head smut caused by Sphacelotheca reiliana.

This smut has been reported from several places in Kansas and Texas by Melchers and Taubenhaus. It appears not to be serious, however. This smut is being found on corn in new localities in the state of Washington this year (See Pl. Dis. Bul. 5: 92. Sept. 15, 1921).

Covered kernel smut caused by Sphacelotheca sorghi.

This disease is reported as very common in Kansas fields where seed treatment is not practiced. Complete control obtains, however, where seed is treated. It is prevalent in Texas and a specimen has been received from Alabama.

RED CLOVER

Another statement regarding red clover diseases has been received from W. D. Valleau of Kentucky. Information on this subject is needed from a considerable number of other states, particularlly those where red clover is most important. The statement reads as follows:

"The clover disease situation is, I believe, not serious in this state, although all of the commonly reported diseases are present. I am of the opinion that the diseases do not play an important part in the clover crop failure, although they do cause a considerable amount of damage in many cases.

"I am unable to give estimates of the losses in individual fields, or over the state, due to any diseases except Sclerotinia trifoliorum which caused losses the past year of not over 5% of red clover in several fields examined. So far we have had no cases of undetermined root rots called to our attention with the exception of a slight amount of seedling blight when the seedlings were grown in sand.

"Sclerotinia trifoliorum appears not to be serious in this state as a red clover disease, although it caused a great amount of injury to crimson clover, alfalfa, and the past year, to sweet clover."

After giving experimental data obtained from Professor Roberts, Department of Agronomy, Kentucky Agricultural Experiment Station, showing the great benefit derived from the application of acid phosphate and limestone, Valleau concludes:

> "It is evident from this statement, that the production of clover in this state is nearly entirely dependant upon the proper handling of the soil, and it would not be surprising if a similar situation were found throughout a considerable portion of the middle eastern states."

FRUIT CROPS

APPLE

The condition of apples in the United States is reported September 1 as 35.5%, while the 10-year average is 58.4%. The total production is estimated (Mo. Crop Reporter, Sept. 1921) as 109,166,000 bushels as compared with 244,022,000 bushels of last year and the commercial production estimate is placed at 19,509,000 barrels as compared with 37,239,000 barrels of 1920. Washington, Oregon, and other far western states have good crops, while in the East, New England seems to have a fair yield and New York about two-thirds of the average production, but less than half that of last year.

On account of the small crop many orchards have been more or less neglected this year so that diseases have had an opportunity to develop. The peculiarlly dry hot season has apparently retarded scab but others such as blotch and fire blight apparently have not been greatly checked. The following additional reports of apple diseases have been received since the last Bulletin:

Blotch caused by *Phyllosticta solitaria*.

Pennsylvania: First report June 11 from Adams County. Prevalence about as last year. Principal damage in small home orchards, usually not sprayed. Severe infection has been reported from Adams, Somerset, Crawford, Mercer, and Philadelphia Counties. (Thurston, September 1).

Alabama: Occurs in northern part of state. Amount of damage not available. (Povah, September 1).

Texas: Fairly prevalent, 5% loss. (Taubenhaus, September 1).

Scab caused by *Venturia inaequalis*.

Scab is troublesome in New England on fruit of susceptible varieties. (McIntosh). In Vermont the fruit damage is said not to be heavy, although foliage infection was heavy earlier in the season. In Minnesota infection of the fruit is reported very light.

Fire blight caused by *Bacillus amylovorus* reported as very common locally in Vermont, especially on sweet varieties, and as light to moderate in Minnesota where it is less injurious than last year.

PEAR

On September 1 the condition of the pear crop was reported as 45.3% of normal, while the 10-year average for September 1 is 65.8%. (Monthly Crop Reporter, September 1921). A production of 9,475,000 bushels as compared with the 17,279,000 bushels of last year is estimated. As usual, the leading pear states are California, Washington, and New York. Reports on diseases follow:

Scab caused by Venturia pyrina.

Maine: One specimen of pear scab, the only case of a pear disease, reported so far this season. (Morse, September 15).

Connecticut: At least as bad as average years. (Clinton, September 15).

Pennsylvania: Reported only from Philadelphia and Bucks Counties. Damage slight. (Thurston, September 15).

Florida: Specimens of pear scab were brought in from Alachua County. The markings were slight. (Burger, August 1).

Ohio: More specimens of pear scab have been received this season than during any three previous seasons. (Thomas, September 15).

Wisconsin: Causing some damage in southeastern Wisconsin. However, pear growing is of very minor importance in Wisconsin. (Vaughan, September 15).

Fire blight caused by Bacillus amylovorus.

Connecticut: Few complaints, but apparently at least the usual amount. (Clinton, September 15).

New Jersey: Common occurrence, but not severe. (Cook, September 15).

Delaware: Generally prevalent, but injury slight compared with early frost effect on new growth. (Adams, August 1).

West Virginia: Not particularly destructive this season although an occasional tree shows considerable blight. (Giddings, September 15).

Tennessee: (East) Fire blight common everywhere and usually very destructive. (Sherbakoff, August 11).

Georgia: Pears promise an average crop, although some blight damage is noted. (Bureau of Markets and Crop Estimates, Crop Notes, week ending Sept. 10).

Florida: The pear orchards are in a very bad condition in Florida due to this disease. In many sections the growing of pears has been abandoned. (Burger, August 1).

Ohio: The chief source of loss to pear plantings occasioned by fire blight is recognized to be in scattered home plantings throughout the state. Where pears are grown on a commercial scale little evidence of the disease has been noted. How much of this is due to protective sprays and how much to pruning, it would be difficult to say. Possibly both have contributed. While little difficulty is experienced in obtaining specimens from nearly all sections of the state, the loss occasioned by fire blight was thought to be less this season than normal. (Thomas, September 15).

Wisconsin: More than usual, follows with the increase of this disease on apple. (Vaughan, September 15).

Kansas: Less common than usual. (Melchers, September 15).

Colorado: This disease has not been reported for this state so far this season. (Learn, September 15.)

Leaf spot caused by Septoria piricola.

Delaware: Very prevalent and serious infection because of neglected spraying of trees. (Adams, August 1).
Florida: This disease was reported from West Florida. The report stated, however, that the disease was not severe. (Burger, August 1).

Leaf blight caused by Fabraea maculata was reported by Adams of Delaware as follows on August 1: "Because of early frosts spraying of pears was neglected, which has favored severe infection. Trees the last of July were 60% defoliated."

GRAPE

Black rot caused by Guignardia bidwellii.

New Jersey: Less severe than usual. (Cook, September 15).
Ohio: Losses due to black rot are not thought to be greater than normal. It is interesting to note that in the grape growing sections, particularly in northern Ohio this is a comparitively rare disease, whereas throughout the other sections of the state where grapes are not grown commercially, but only for home use attacks of the fungus are very severe. (Thomas, September 15).
Indiana: Apparently, much worse than usual this year. (Gardner, July 1).

Downy mildew caused by Plasmopara viticola.

New Jersey: Much less than usual. (Cook, September 15).
Ohio: Considerable loss has been occasioned by the Downy mildew this year. Attacks have been especially severe on young vines and seem to be confined to the early and mid-season. Less evidence of the disease is to be found at the present time. (Thomas, September 15).

VEGETABLES AND FIELD CROPS

POTATO

Wart caused by Chrysophlyctia endobiotica.

Three new localities have been added to the list of wart infested areas in the United States as a result of the potato wart survey during 1921. These are located in Allegany County, Maryland, and are as follows: Midland, Charlestown, and Detmold. The last two named villages adjoin the town of Lonaconing on the southeast and southwest respectively. One infested garden was found at Midland, one heavily infested garden of about one-fourth acre at Charlestown, and three badly infested gardens at Detmold. In the villages where wart was

discovered in 1920 new gardens were found to be infested and those located in 1920, when reexamined this year, were severely infested. The State of Maryland has placed a quarantine on the infested areas and a program is being conducted to obtain the cooperation of all potato growers in Allegany and Garret Counties to assist in preventing the spread of the disease.

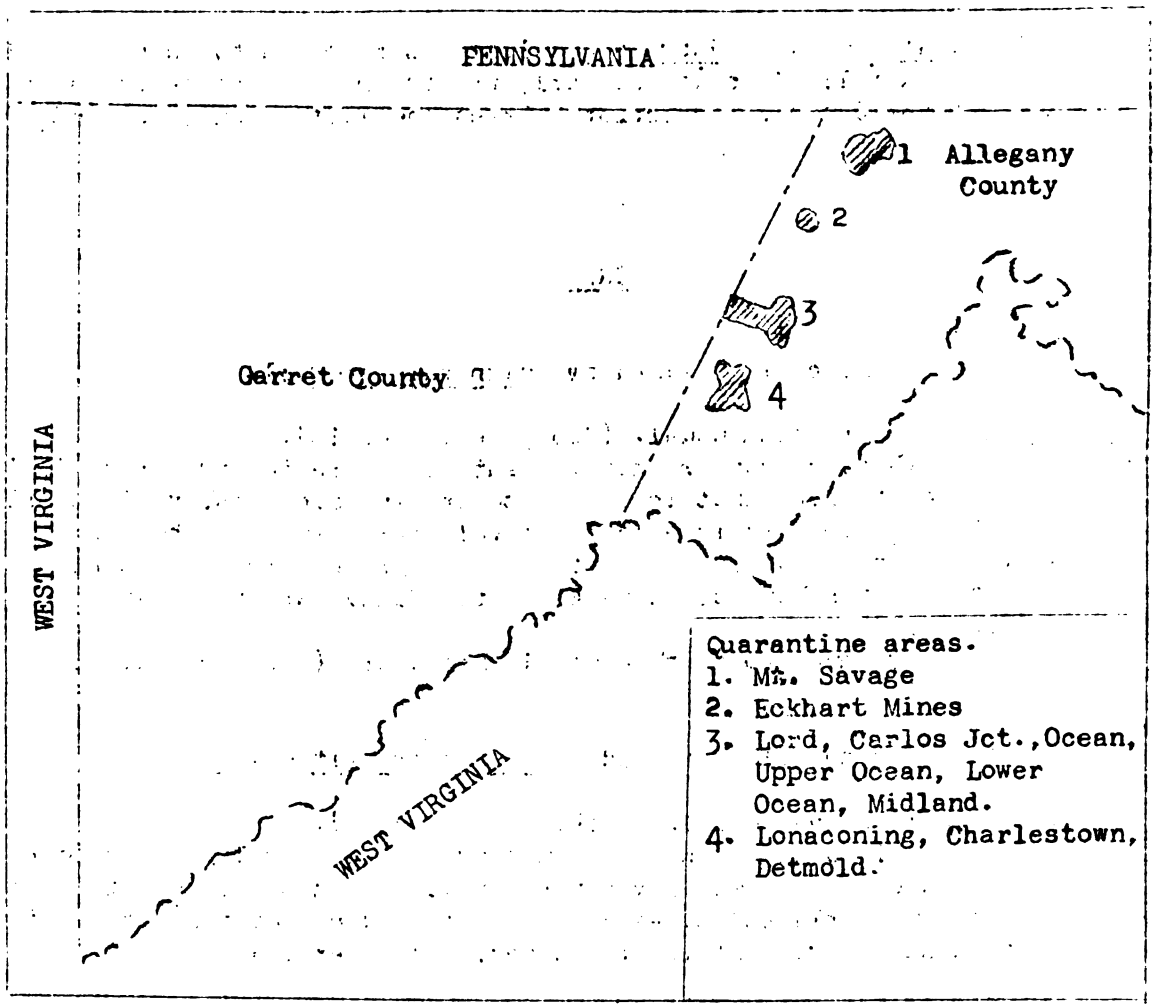

Fig. 2. Garret County, and a portion of Allegany County, Maryland showing general location and relative size of the four potato wart quarantine areas of western Maryland.

Two new findings were made in Pennsylvania, one in the Hazelton quarantine area and the other in the Llanfair-Beaverdale locality. These findings do not extend the wart zone as do those which were located in Maryland during the past summer. Although the Maryland infestations are in the same coal zone which extends from Pennsylvania into West Virginia, yet the Lonaconing area brings the known infestation in Maryland several miles farther south and nearer the Thomas area of West Virginia.

Late blight caused by Phytophthora infestans.

Since the last Bulletin, late blight has been reported from other parts of New England, but as will be seen from the reports it has appeared so late that

there is little liklihood of any particular damage.

Maine: (Aroostook County) Late blight is really here but so slight that it would be overlooked by almost anyone but a trained observer. It is present just the same in quite a number of fields. It will not be a factor in the yield but may result in an occasional rotten tuber, particularly if digging has to be done under wet conditions. In that case we may get more rot than I think. However, a frost that may come at any time now would largely, if not entirely, eliminate the danger of rot. (Morse, September 13).

New Hampshire: Late blight has been very scarce in the state this year and we will have very little tuber rot. We have had a very dry summer and I have seen the disease only once in a non-sprayed field and while it was well distributed over the field, the damage done at the time of my visit September 14 was negligible. (Butler, September 19).

Massachusetts: We have kept close watch for late blight this summer, but have found no signs of it until September 11. On that date the disease was found in a local garden, but the infection was not heavy. The weather was so dry throughout August that there was little opportunity for the blight fungus to develop and since the potato crop has matured very early this year and consequently most of the vines are now practically dead through early maturity, there is not likely to be much damage from late blight even if weather conditions favorable to it should develop. (Osmun, September 14).

New York: Since September 1 the disease has shown up in nearly every county of the state. In most cases, however, the blight is not at all severe but Professor Hoerner reports that Saratoga County fields were pretty badly hit. Nearly all fields are dead now all over the state, but most of this was due to such severe insect injury that the vines became brown prematurely. For this reason any fields in which blight has not yet shown will hardly be attacked this year. We have never had such early dying of the plants, but as I said above this dying is due only in a very few cases to blight. So far as tuber rot is concerned and reduction in yield, I think the losses are only but a trace. (Chupp, September 13).

Michigan: We had specimens of the early phase of attack from Alpena County, collected by H. C. Moore on September 4. (Coons, September 15).

Early blight caused by Macrosporium solani.

Maine: (Aroostook County) There is more early blight than I have seen elsewhere, but it is not going to damage the crop. (Morse, September 13).

New Hampshire: Except in rare instances, no material damage done. (Butler, September 1).

Minnesota: Fairly common on Green Mountains in Beltrami County, August 1. Very little found in Red River Valley on Early Ohios. (Stakman, September 15).

Nebraska: Very slight amount of infection. (Goss, September 1).

North Dakota: Early blight was not noticeable to any marked extent in any potatoes in the Red River Valley as in the case of other fungi. The drouth and hot weather seem to have been sufficient to essentially eliminate this disease. (Bolley, August 1).

Kansas: About 5% damage to the crop. (Melchers, September 1).

Fusarium wilt caused by Fusarium oxysporum.

Minnesota: Reported more severe than usual. Spots found in various fields of Green Mountain, Irish Cobbler, and Early Ohios, in northern part of the state. These varied from 10 to 30 feet in diameter and plants were severely infected. (Department of Plant Pathology, Stakman, September 15).
Nebraska: Five to ten per cent infection. (Goss, September 1).

Tip burn and hopper burn caused by weather conditions and leaf hoppers.

New Hampshire: Quite prevalent throughout the state. (Butler, September 1).
Minnesota: Hopper burn on potatoes was more severe this year than has been noted before. Seems to be associated with the curling and dwarfing of the leaves. (Stakman, September 15).
Kansas: Quite severe the latter part of June and early July. (Melchers, September 1).

TOMATO

Leaf spot caused by Septoria lycopersici.

According to F. J. Pritchard and W. S. Porter (Journ. Agr. Res. 21: 501-506. July 1), the horse nettle (Solanum carolinense L.), a widely distributed weed, is a very susceptible host of Septoria lycopersici. In Maryland, New Jersey, and Delaware, where the disease causes heavy annual losses, the weed is especially common, often occurring in tomato fields, sometimes in greater numbers than the tomato plants themselves. In view of the fact that horse nettle has been found to be a host of the tomato Septoria, collaborators are asked to watch S. carolinense for leaf spot and to report the observations and send specimens to this office.

Connecticut: No more than in average seasons. (Clinton, September 15).
New Jersey: Very abundant and destructive. Appeared about the 10th of July. (Cook, September 15.)
West Virginia: Quite serious in occasional gardens. Reported most from central and southern part of state. Very well controlled by Bordeaux spray. (Giddings, September 15).
Tennessee: Leaf blight (Septoria) is pretty common in East and West Tennessee, in places causing considerable damage. (Sherbakoff, August 11).
Ohio: This leaf spot of tomato has been of minor importance this season. Only a few specimens have been collected. (Thomas, September 15).
Wisconsin: Less than usual. (Vaughan, September 15).
Minnesota: Moderate infection reported August 1 from Ramsey County. (Stakman, September 15).
Kansas: Very common in most fields. About 10% loss. (Melchers, September 15).
Colorado: I have noticed this disease in several gardens about Fort Collins. (Learn, September 15).

Fusarium wilt caused by Fusarium lycopersici.

New Jersey: Infected areas gradually increasing. (Cook, September 15).

West Virginia: Quite general throughout the state but we do not have very much data as to actual loss. (Giddings, September 15).

Tennessee: (East) Common and, in many cases, causing serious losses. (Sherbakoff, August 11).

Florida: Several specimens were sent in from various localities. No complaint, giving indications of severe losses , was received. (Burger, July 15).

Ohio: Fusarium wilt of tomato is becoming gradually more prevalent throughout the state. Its progress is most rapid in centers where the tomato is commercially cropped. The past season has been marked by very extensive losses both in crops grown under glass and in the open field. In many sections it is scarcely worth while to attempt to grow tomatoes other than resistant varieties. (Thomas, September 15).

Kansas: Common in counties in southeastern Kansas. This disease is becoming more common and serious each year. (Melchers, September 15).

Early blight caused by Macrosporium solani.

Pennsylvania: Has caused considerable damage in the southern part of the state, locally. A loss of 50% in one field in Bradford County, was recently reported. (Thurston, August 15).

West Virginia: Quite common in the Ohio Valley and occasionally injurious in other sections of the state. (Giddings, September 15).

Ohio: In marked contrast to last season, comparatively little of this disease has been observed this year. While there is little difficulty in finding traces of it in nearly all sections of the state it has occasioned no loss. (Thomas, September 15).

Wisconsin: Of minor importance, not doing any damage. (Vaughan, September 15).

Mosaic (cause undetermined).

Connecticut: Apparently more prevalent than usual. (Clinton, September 15).

New Jersey: Less severe than usual, but severe in some fields. (Cook, September 15).

Kansas: Very common in most fields, causing loss in production. (Melchers, September 15).

Cracking due to dry weather.

Ohio: A very large part of the tomato crop throughout the early and mid-season was lost due to cracking which occurred in the epidermis both radial and circular, thought to be due to dry weather. These resulted in a very large number of leakers which very seriously interfered with the handling and shipping of the crop. (Thomas, September 15).

ONION

Smut caused by Urocystis cepulae.

In New York, according to reports in the Weekly News Letter of the ments of Entomology and Plant Pathology of the State College of Agricult

smut was very common in Orange and Wayne Counties during May and June, although the formaldehyde treatment gave good control. In Orange County (June 13), check rows showed as high as 52% smut, while treated rows had only about 5%. In Wayne County (May 31) the disease was so common that a number of farmers plowed up their fields, and it appeared in new sections where onions had been grown only once or twice. Later reports, however, state that drought and thrip injury were the most important factors in reducing the crop.

Ohio: Excellent control in all cases where formaldehyde drip treatment is used. (Thomas, September 15).

Wisconsin: More than for several years. Rains before seed germinated evidently washed out the formaldehyde so that seed treatment was less effective than usual. (Vaughan, September 15).

Oregon: I spent July 19 with Professor Barss in the onion growing section of Washington County, Oregon. The two important problems there are the smut and mildew. Professor Barss has a small but very convincing demonstration of formaldehyde drip control for smut in one field. He has tried out several formulae and the results coincide with those we have secured in eastern sections. (Walker, J. C. News Notes, Office of Cotton & Truck, August 6, 1921, page 4.)

Downy mildew caused by Peronospora schleideni.

Ohio: Disease thought to be about what is found during normal years. In the early part of the season no reports came to our notice due to dry weather. Slight attacks developed later in early August. (Thomas, September 15).

Oregon: (Washington County) Mildew varies widely in its importance from season to season. In 1916 the crop was nearly ruined, but since that time it has been of little importance. We found a little of it in several fields and in one seed planting, but if dry weather prevails it will not be serious. Ordinarily the weather is very dry here from June 15 to September 1, hence it is only in those unusual seasons when rains do occur during this period that mildew is a factor. (Walker, J. C. News Notes, Office of Cotton & Truck, August 6, 1921, page 4.)

Pink root caused by Fusarium mallii.

Oregon: (Washington County) We found some small spots of pink root in a few fields. I doubt if it is the severe type found in Texas. It appears to be correlated with poor soil conditions which are responsible for unthrifty plants. (Walker, J. C. News Notes, Office of Cotton and Truck, August 6, 1921, page 4.

California: About 1,000 acres in Delta region (Islands) abandoned. Soil severely infested. In Coachella Valley, Riverside County, .5% infected roots. (Milbrath, July 15).

WATERMELON

Anthracnose caused by Colletotrichum lagenarium.

New Jersey: Prevalent. (Cook, August 15).

Virginia: Reported from Madison (July 10) and Mecklenberg (July 20) Counties. (Fromme, August 15).

West Virginia: Very prevalent and destructive in the Ohio Valley. (Giddings, September 15).

Tennessee: (Vicinity of Chattanooga) Two fields examined, anthracnose the only disease found. In one field the damage was negligible although the disease was present on most of the plants. In the other field more than 90% of the plants were practically destroyed by the disease. (Sherbakoff, August 11).

North Carolina: Definite reports not available but known to be destructive when spraying is not practiced. (Foster, August 15).

Florida: (May 5) Throughout the southeast dry weather has prevented anthracnose being a factor to date. Occasional infected vines are to be found in fields about Lakeland.

(June 1) Several days of heavy rain during the week of May 17 served to check the aphids but also to start the spread of anthracnose. Many fields were completely ruined by the epidemic, and the melons are now baking in the sun. Growers farther north have sprayed thoroughly, and reports have been received to the effect that anthracnose has been controlled. (Meier, F. C. News Notes of the Office of Cotton, Truck, and Forage Crop Disease Investigations 105: 5. June 4.)

Mississippi: Reported from Clay and Lauderdale Counties. Reported last season from only Clay County. One grower reports severe damage in a field of five acres near Meridian. (Neal, August 15).

Louisiana: Scattering infection but causing only slight loss. Spots develop very slowly in this climate. (Edgerton, August 15).

Texas: Fairly common this year due to rains. Four per cent loss in the fields. (Taubenhaus, August 15).

Ohio: The most conspicuous disease of watermelon for the current season has been anthracnose. From 2-10% of the local production in the state shows infection. (Thomas, September 15).

Kansas: Very common on melons and foliage. Destruction of foliage early in September was responsible for melons being sunburned. Loss about 40%. (Melchers, September 15).

Stem end rot caused by Diplodia sp.

Experiments reported by F. C. Meier (Bu. Mark. & Crop Est. Field & Veg. Div. Letter, June 23) indicate that only Diplodia is capable of producing stem end rot. Inoculations were made on freshly cut surfaces with spores and mycelia of several fungi, including Diplodia sp., Phoma sp., Mycosphaerella citrullina, Fusarium sp., Alternaria sp., and Rhizopus nigricans, all of which had been found associated with watermelon decay in the field.

Delaware: First observed August 2. Very prevalent in early planted fields and more common on new ground. Some fields will run 5% infection. (Adams, August 15).

North Carolina: Not common under field conditions. (Foster, August 15).

Florida: Some Diplodia showed in the fields. Returns from the receiving market show loss in transit from this fungus. Where the stem end was treated there was very little rot. (Burger, August 15).

Mississippi: Does not appear as serious as last season, probably because of the dry weather which has prevailed. The melon centers of the southern part of the state have suffered from extreme dry weather. (Neal, August 15).

Louisiana: Very slight. Saw only a very few melons affected. (Edgerton, August 15.)

Texas: Traces in the field. Non-important, more of a transit trouble. (Taubenhaus, August 15).

Kansas: Occurs to some extent in most fields. (Melchers, September 15).

ASPARAGUS

Rust caused by *Puccinia asparagi*.

In reply to the question: "To what extent is asparagus rust prevalent in your state in 1921 as compared with (a) 1918 to 1920, and (b) the years immediately subsequent to the introduction of rust into the state", the following replies from collaborators have been received to date.

Massachusetts: (a) The rust situation in Massachusetts is practically the same this year as from 1918-1920, that is, it is generally distributed but of no particular consequence.

(b) The first authentic report of rust in Massachusetts was in 1896. In 1897 there was a serious outbreak of the disease in the eastern part of the state and in 1898 as a result there was a very serious falling off in the crop. This continued for some years, but the development of resistant strains and their quite general adoption by growers has reduced the rust problem to relatively little importance. Asparagus has never suffered to any great extent in western Massachusetts. (Osmun, Anderson & Krout, September 20).

Connecticut: (a) Asparagus rust has not been very abundant here in any of the years from 1918 to 1921, so it is hard to determine whether it is more or less prevalent this year than in the three preceding years.

(b) It certainly is very much less prevalent in recent years than in those following its introduction into the state. (Clinton, September 21).

Pennsylvania: Asparagus rust is no more prevalent in 1921 than in previous years. (Orton, September 23).

Georgia: I have not seen any serious cases of rust in this state since 1918. (McClintock, September 19).

Louisiana: Have not seen the rust in Louisiana. (Edgerton, September 22).

Michigan: (a) More abundant this season than for many seasons past.

(b) Have no data to compare with the first invasion. (Bessey, September 19).

Wisconsin: Asparagus rust is less prevalent in 1921 than in 1918, 1919, or 1920. In fact, I have seen it this year only once or twice and then in only mild form. (Vaughan, September 19).

North Dakota: (a) Rust less destructive in 1921 than in the years mentioned.

(b) Difficult to answer as to what destruction is wrought by the rust. Rust was abundant in the state in 1890, when I first came here, it being prevalent on small garden plantings. Even at the present time there are certain plantings which appear to almost entirely escape it and certain others which are very severely injured. I would think it a safe guess that the vitality of the roots for the next year on a crop which is attacked this year is very considerably reduced. A rough guess

of 10% in production would certainly be not too heavy if the rust was even on the foliage of the plot. (Bolley, September 20.)

Kansas: About the same this year as in 1918 to 1920. Am unable to compare with the years immediately subsequent to the introduction of rust into the state. (Melchers, September 28).

TOBACCO

Dr. W. D. Valleau has called attention to an error made in quoting his report on tobacco leaf wilt in the last number of the Bulletin (page 107). Instead of "growing plant" in the second line it should read "growing point".

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UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

Issued by

THE PLANT DISEASE SURVEY

Vol. 5. October 15, 1921 Number 8.

CONTENTS

Reports on corn diseases are featured in this issue of the Bulletin.

Fabraea maculata is severe on pears in Illinois this year, according to Anderson. (Page 126).

CEREAL AND FORAGE CROPS

CORN

The following statement concerning the condition of the corn crop has been given out by the Bureau of Markets and Crop Estimates in the Crop Notes for the week ending October 1:

"The corn crop in most of the country is fully matured and harvesting has made good progress. Good yields of high quality are reported in most sections. Husking has commenced and will soon become general;

cribbing has already begun in some sections. Danger of damage from frost is now nearly negligible. Some damage from ear worms and also from molding in the shock, due to rain, is reported in Illinois, Indiana, and Iowa. The yield of the late crop in the southeastern section is being cut somewhat by drouth and the grain is not filling satisfactorily."

Smut caused by Ustilago zeae.

Further reports on the corn smut situation have been received as follows: The observations of H. L. Bolley of North Dakota are of particular interest.

Vermont: A little less than average but not as much less as would be expected from the very dry year. (Lutman, October 1).

Delaware: Very prevalent with field corn. Infection of leaves at nodes more common than tassel or ear infection. Infection in many fields ranges from 2-5%. (Adams, October 1).

West Virginia: Reported as severe in some fields, but I do not think that it caused as much loss as in 1920. (Giddings, October 1).

Alabama: Small amount. (Povah, October 1).

Mississippi: Appears to be more severe this season than usual. Very abundant on Station farm and other parts of state visited. (Neal, October 1).

Arkansas: Rather common, less than 1% injury. (Elliott, October 1).

Ohio: The greater number of early infections seemed to be of the leaf and leaf sheath type, followed later by node and tassel infections. In certain fields investigated 5-10% of the buckling of stalks was due to node infections by this organism. Losses are estimated to be about 1-2%. (Thomas, October 1).

Illinois: About 5.5% of plants infected; loss in yield estimated at 2%. (Dungan, October 1).

Michigan: Common this year; many farmers state worst in years. Relation to rotation evident in college breeding plats, where one or two cases of 90% infestation were found. Edibility, "a la Stevens" tested with excellent mycophagic results. (Coons, October 1).

Wisconsin: More than for several years, especially called to our attention from Pierce and St. Croix Counties. (Vaughan, October 1).

North Dakota: Corn smut has been quite common in certain fields. This disease will apparently become quite difficult to control unless more effort is made. Large percentage of stalks in some fields are affected. Since the country is new to corn only two conclusions can be drawn. Either the spores are carried long distances by the wind or the crop is infected by the planting of infected seed. The latter question needs close study. While it is evident that this disease can be increased by the applying of manure and refuse from diseased stalks, it is not at all common in North Dakota to apply manure to corn fields so that the heavy infection which sometimes occurs in widely infected fields cannot be explained in that manner. (Bolley, October 1).

Washington: Small amount noted at Pullman and in Yakima Valley; this smut is common but not serious. (Dana, October 1).

Head smut caused by Sorosporium reilianum.

Washington: While in Yakima I found another corn field that was diseased with

head smut. From my observations this smut is in a number of corn fields near Outlook which is in the lower Yakima Valley. (Zundel, September 17).

Root, stalk, and ear rots caused by Gibberella saubinetii, Fusarium sp., etc.

Collaborators report as follows concerning the root and ear rot situation this year:

Vermont: Not observed. Believe that the season has been too dry as yet. (Lutman, October 1).

Delaware: Generally distributed throughout the state and will probably reduce the yield 10-15%. Prematuring as the result of infection on demonstration plots ranges from 5-30%. In two fields barren stalks on the basis of one hundred hills ranged from 11-28%. A general condition of systemic infection was found in one field where the nodes showed infection from base to tassal. The nodes were stringy as the result of infection with many stalks broken down and fallen over. The serious prevalence of corn ear worm this season has resulted in the increase of kernel rot and moldy ears. In most every instance of ear work injury the ear rot fungi are found established. Observations so far show that Fusarium moniliforme, Cephalosporium sacchari and Diplodia zeae are commonly associated with the feeding of ear worm. The excessive moldy condition of ears this season may be charged to the ear worm as the result of its infestation. In many instances at least 10-15% of the weight of grain of infested ears is destroyed. (Adams, October 1).

West Virginia: Quite general throughout the state and reported as causing considerable loss in some of the southeastern counties. (Giddings, October 1).

Mississippi: Root and ear rots caused by Fusarium spp. are common again in many sections of the state. As high as 10% infection is commonly observed. No estimates as to amount of damage. (Neal, October 1).

Arkansas: Not so severe as usual. Worm eaten ears generally attacked. (Elliott, October 1).

Ohio: This disease is recognized to be generally prevalent throughout Ohio, occasioning greater concern each year. Losses for the current year have been especially serious in southwestern Ohio, particularly where crib selection of seed corn is practiced. There is no question but that certain species of Fusaria are responsible for greater losses in Ohio than any other classes of organisms, as demonstrated by extensive cultural investigations. (Thomas, October 1).

Illinois: Reduction in yield is fully 10%; latter part of season has been favorable for corn rots. (Dungan, October 1).

Michigan: No loss reported. (Coons, October 1).

Wisconsin: Seedling infection fairly abundant during the spring. Prevalent as an ear rot late in season especially on late planted corn. (Vaughan, October 1).

North Dakota: North Dakota lands are comparatively new to corn and on account of the attempt of the growers to hasten maturity to save seed to escape frost, special selection of corn has been pretty generally practiced with the result that ears are better selected and dried than is usual in general corn districts, and it is probable that infected ears have not been commonly saved although the growers did not know the danger of planting infected corn. As yet rot is not abundant although it is not uncommon. Dry weather conditions in the fall also probably aid in keeping the seed free. (Bolley, October 1).

Brown spot caused by Physoderma zeae-maydis.

Physoderma appeared on corn in experimental plots at the United States Department of Agriculture Experimental Farm at Arlington, Virginia this year. The disease seems to be especially abundant in Ohio this year, according to the report given below.

South Carolina: Present. Extent of injury unknown but evidently not excessive. (Ludwig, October 1).
Alabama: Disease plentiful but apparently little damage, probably owing to dry weather. (Povah, October 1).
Mississippi: Present in about the same amount. Damage negligible for the entire state. (Neal, October 1).
Arkansas: Common in every field, but not very severe. (Elliott, October 1).
Ohio: The brown spot disease has been observed in every corn field investigated throughout the state. Except in certain sections which suffered seriously from drought during the midsummer period, losses have been slight, averaging less than .5%. (Thomas, October 1).
Illinois: About 5% of plants show trace of infection, but loss is probably slight. (Dungan, October 1).

Rust caused by Puccinia sorghi.

A slight amount of corn rust has become evident as shown by the following reports:

West Virginia: Quite general but apparently causing little damage. (Giddings, October 1).
South Carolina: Present. Damage probably not great. (Ludwig, October 1).
Alabama: Very slight infection seen. (Povah, October 1).
Arkansas: Much less than usual. (Elliott, October 1).
Illinois: Trace. (Dungan, October 1).

Bacterial wilt caused by Aplanobacter stewartii.

That bacterial wilt is rare is evident from the following reports, most of which are negative.

Vermont: Not observed. We are out of the northern range. (Lutman, October 1).
West Virginia: Not reported. (Giddings, October 1).
Alabama: Not seen. (Povah, October 1).
Mississippi: Not present in the state. (Neal, October 1).
Arkansas: Reported from only one locality. (Fort Smith, 1920). (Elliott, October 1).
Ohio: Not observed this season. (Thomas, October 1).
Illinois: Trace. (Dungan, October 1).
Michigan: Not seen. (Coons, October 1).
Wisconsin: No cases seen or reported. (Vaughan, October 1).
North Dakota: The new lands of North Dakota have not had opportunity to be largely infected by any of the root and seed diseases, and the possible result is bacterial disease is not often observed. (Bolley, October 1).
Washington: No reports. (Dana, October 1).

FLAX

Wilt caused by Fusarium lini.

Wilt has been reported as occurring rather generally in Minnesota and North Dakota. Reports have also been received from Wisconsin and South Dakota.

Minnesota: First reported May 5, in Ramsey County. Reports vary from trace to 5% throughout the state. (Department of Plant Pathology, September 15).

North Dakota: The wilt diseases as usual have been rather evenly distributed, particularly in the eastern half of the state on the old lands and have done damage in direct ratio to the plantings made on old lands. Seed was of unusually good quality the past year. Most areas of wilt destruction were found upon lands already infected. Control has been quite evident on all those fields where proper wilt resistant stuff has been planted. (Bolley, October 1).

Rust caused by Melampsora lini.

North Dakota: Some fields, even of the strong wilt resistant flax, have suffered badly from rust. This disease, as in the case of wilt, is a result of planting too constantly on the same land, and like rust in other crops, depends largely for its destructive nature on the condition of the weather and the maturity of the crop. (Bolley, October 1).

FRUITS

The following reports concerning diseases of pear and of grape have been received from Illinois. The Fabraea leaf spot of pear and black rot of grape have apparently been quite important in that state this year.

PEAR

Blight caused by Bacillus amylovorus. - Not especially serious on pears this year. Some late blight developed on large limbs. (Anderson, September 15).

Fabraea leaf spot caused by Fabraea maculata. - Worst epiphytotic ever experienced on mature trees. Especially bad in Marion County and Union County where most of the pears of the state are grown. Also severe in nursery on French seedling stock. In one nursery French seedlings completely defoliated while Kieffer seedlings showed no injury. Serious on Kieffer in orchards, however. No spraying done this season since no crop was expected. (Anderson, September 15).

Leaf spot caused by Mycosphaerella sentina.- Not of any importance this year. Fabraea spot caused all the trouble. (Anderson, September 15).

GRAPE

Black rot caused by Guignardia bidwellii. - Unusually serious this year on unsprayed vines. In some localities caused almost total loss of crop. Well sprayed vineyards did not suffer. (Anderson, September 15).

Downy mildew caused by Plasmopara viticola. More than the usual amount of downy mildew occurred on the vines this season. Also some injury of the fruit. Most of blight appeared late in season. August and September very wet. (Anderson, September 15).

Surface mildew caused by Uncinula necator. - More than usual on all vineyards observed but developed late in season causing little injury. (Anderson, September 15).

VEGETABLE AND FIELD CROPS.

PEANUT

Leaf spot caused by Cercospora personata.

South Carolina: Rather severe in the vicinity of Clemson College but does not seem to have decreased the crop very much. No complaints from other localities, although it is doubtless present. (Ludwig, October 1).

Alabama: Abundant. Damage questionable. (Povah, October 1).

Arkansas: Fairly common, probably causing some reduction of yield. (Elliott, October 1).

Tip burn (possibly caused by leaf hoppers).

South Carolina: A burning of the leaves, originating as a triangular yellowed area in the outer half of the leaflet, occurred earlier in the season. It was associated with an attack of leaf hoppers and possibly was caused by them. The trouble was referred to the Entomology Division of the Experiment Station here, and they are of the opinion that the leaf hoppers caused the trouble. (Ludwig, October 1).

Southern Sclerotial blight caused by Sclerotium rolfsii.

Alabama: Slight amount of infection. (Povah, October 1).

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Map showing area where freezing temperatures have occurred this fall given on page 129.

The potato crop being harvested is very free from late blight rot, but there are reports indicating that scab may be somewhat worse than usual. Is this true according to your observations?

Reports on leaf roll and mosaic of potato in this issue.

Early blight of potato did damage during September in Michigan and Wisconsin.

Cabbage yellows destructive and on the increase this season.

Sugar cane and sugar beet diseases reported in this issue.

Pecan diseases in Mississippi reported by D. C. Neal on page 140.

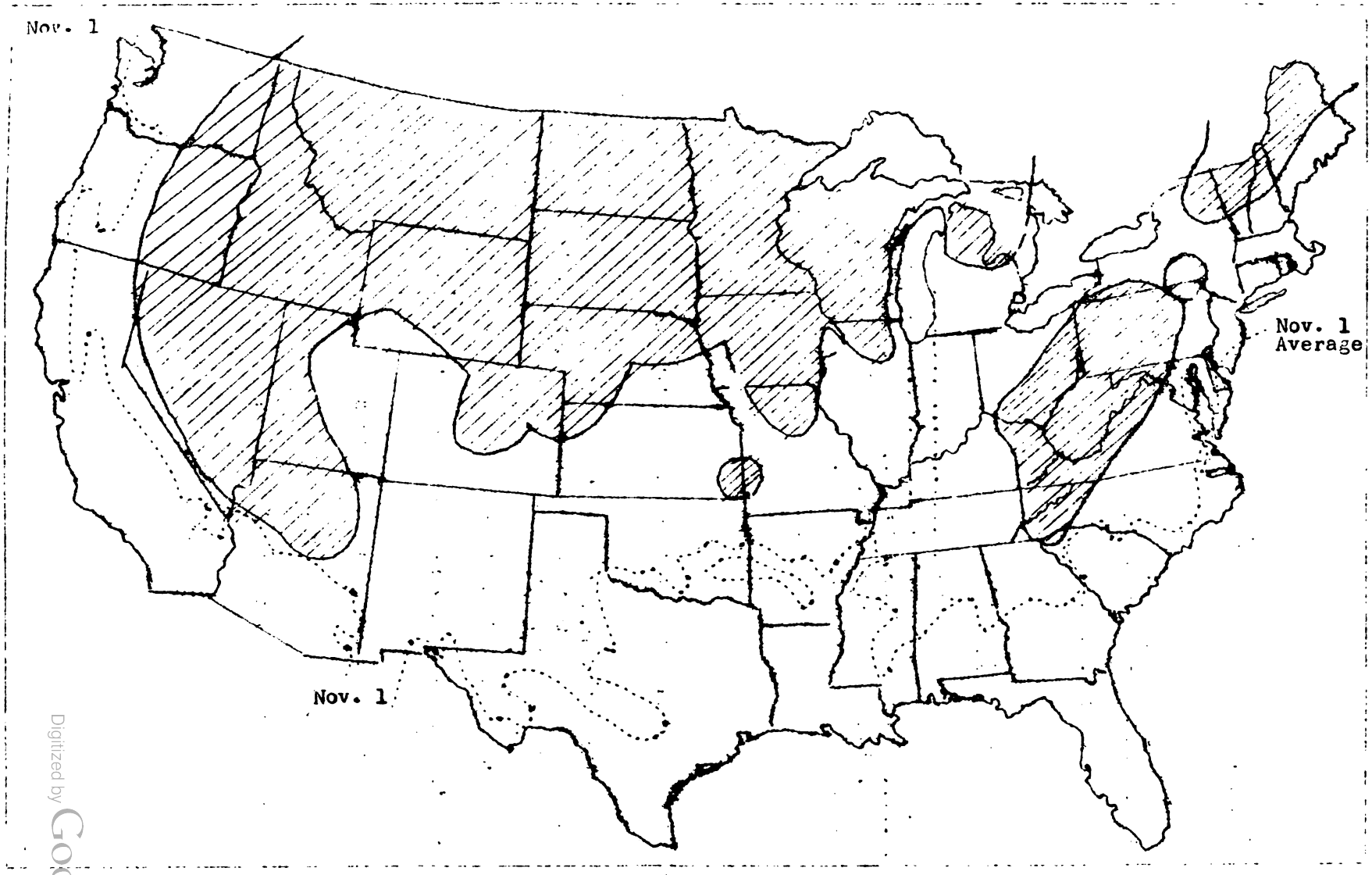

Fig. 3. Regions where freezing temperatures have occurred this fall up to October 25. Thirty-two degrees or lower have been obtained within the shaded area. Dotted line represents average November 1 southern limit of killing frost.

Fall Frost Data.

In many parts of the country the fall frosts have occurred later than usual this year. On the accompanying map the dotted line passes through the regions where the average date of the first killing frost in the fall over a 20-year period occurred on November 1. ("Frost and the Growing Season" in the Atlas of American Agriculture). It will be seen that this year the November 1 frost limit will undoubtedly fail to reach nearly so far southward as normally.

Regarding fall temperature the National Weather and Crop Bulletin gives the following:

September 28: "The occurrence of killing frost this fall has been delayed beyond the average date in the more northern sections of the country. By October 1 killing frost occurs, as a rule, in the interior of New England and New York, in the western Upper Lake region, and to the westward as far south as south-central Wisconsin, southern Iowa, and central Nebraska. So far this season (September 28) freezing weather and killing frosts have not been reported east of the Rocky Mountains except in Montana, portions of Wyoming, extreme western South Dakota, and locally in northern New England."

October 5: "The week (ending October 4) averaged somewhat warmer than normal in most eastern, southern, and Pacific coast districts, while it was cooler than normal in some central, central northern, and northwestern areas."

October 12: "The week (ending October 11) averaged cooler than normal from the Mississippi Valley eastward, except in New England where it was slightly warmer than normal."

October 19: "The week (ending October 18) averaged cooler than normal from the lower Mississippi Valley eastward and above normal in all other districts."

October 26: "The temperature for the week (ending October 25) averaged above normal in practically all sections of the country."

VEGETABLE AND FIELD CROPS

POTATO

On October 20 the digging of the late crop was reported well along in most sections with vines killed by frost in most northern and mountain regions. Although the yield for the country as a whole is small, the tubers appear to be of fair size and of good quality according to the Crop Notes of the Bureau of Markets and Crop Estimates. Only a very little rot is reported and this is localized in New York and Pennsylvania. The Maine crop is the freest from rot that it has been in years.

Late blight caused by *Phytophthora infestans*.

The following reports from the Lake States show the unimportance of late blight in that region this year:

Ohio: Although weather conditions during August have been favorable to late blight none seems to have developed. No cases were present in fields inspected and no specimens or reports have been received. (F. Detmers, October 15).

Indiana: Weather fairly favorable to its occurrence but none found in the state. Special effort made to find this disease. (Gardner, October 15).

Michigan: No additional reports than first from Alpena County. Market condition of crop now moving reported excellent. No record of extension of previously reported outbreak. (Coons, October 15).

Wisconsin: Reported from Price and Rush Counties as slight infection of rot at digging. Damage to state crop as a whole practically nil. (Vaughan, October 15).

North Dakota: Late blight of potatoes not observed in this state this year or previous years. As yet it does not seem to be a factor in potato growing with us. (Bolley, October 15).

Early blight caused by Macrosporium solani.

Early blight has not been destructive this year. A noteworthy feature of its history this year, however, is its appearance late in the season in Michigan and Wisconsin.

Vermont: No change from previous report. Foliage generally all dead before this date. (Lutman, October 15).

New Jersey: General and severe in many cases. (Cook, October 15).

West Virginia: Quite generally observed but severe only locally. (Giddings, October 15).

Virginia: Slight. (Fromme, October 15).

South Carolina: Present. (Ludwig, October 15).

Louisiana: Present in practically all fields but loss very small. (Edgerton, October 15).

Arkansas: Present, but of no importance. (Elliott, October 15).

Ohio: A few scattering cases noted. These were, however, over-shadowed by the extreme prevalence of hopper burn. (F. Detmers, October 15).

Early blight has been rather common this year, especially on the late potatoes. It is interesting to note that spraying which controlled tip burn (hopper burn) very well did not in all cases control early blight. (Clayton, October 15).

Indiana: Worst it has been in three years. Prevalent in all parts of the state. (Gardner, October 15).

Michigan: A late attack in September completely killed back late potatoes. Even plots sprayed as late as September 1 were badly injured. If ever a year proved the name Early blight a misnomer, it was this year. Since tip-burn (Hopper burn) had killed back all early plantings the aggregate loss was small. On affected fields the loss was about 25%. (Coons , October 15).

Wisconsin: Increasing amount late in season but caused little damage. (Vaughan, October 15).

North Dakota: Early blight not pronounced present in the crop of this year, in most parts of the state. Possibly due to dry weather conditions prevailing throughtout the season in most potato districts. (Bolley, October 15).

Utah: Found in practically all potato districts in the state. In only a few fields did it occur in a serious form. The loss to the potato crop

in Utah might be considered slight. (Richards, October 15).

Idaho: Slight amount of infection noted in many fields, not of much economic importance. (Hungerford, September 1).

Leaf roll (cause undetermined).

In addition to the reports of leaf roll given earlier in the season the following notes from collaborators have been received:

New Jersey: Very general on Cobblers. (Cook, October 15).

West Virginia: No cases observed. (Giddings, October 15).

South Carolina: Present. No data as to damage. (Ludwig, October 15).

Louisiana: Very small amount. (Edgerton, October 15).

Arkansas: Not observed. (Elliott, October 15).

Indiana: A real problem in this state and the cause of marked reduction in yield. Worse in northern Indiana, especially Lake County. (Gardner, October 15).

Ohio: The curly dwarf, leaf roll, and mosaic type of trouble has been very common and the losses from it have been heavy. The common practice among our farmers is to get new seed, usually a new variety, every three or four years since they have found that the seed "runs out" in that time. The running out of seed is primarily caused by these troubles. Work during the past two years has shown that careful hill selection or importation of high grade seed from the north are effective control measures. Some varieties develop the leaf roll or curly dwarf tendency more rapidly than others. Our observation has been that with ordinary methods of handling, a good strain of seed is badly "run out" by the third year. (Clayton, October 15).

Michigan: As usual. (Coons, October 15).

Wisconsin: No definite cases seen or reported. (Vaughan, October 15).

North Dakota: Leaf roll not a factor of marked importance here in North Dakota. Seems to be associated with some physiological inability of the crop to supply sufficient moisture to the margins of the leaves. Doubt seriously that it is of parasitic origin. (Bolley, October 15).

Utah: Leaf roll is not clearly defined in Utah and will probably remain so until further research work is done. (Richards, October 15).

Idaho: Leaf roll is becoming of more importance each year. Reduction of yield in infected seed lots has been very marked. (Hungerford, September 1).

Mosaic (cause unknown).

Vermont: No change from previous report. (Lutman, October 15).

New Jersey: Two per cent. (Cook, October 15).

Ohio: No reports. (F. Detmers, October 15).

West Virginia: No cases observed. (Giddings, October 15).

Virginia: Of slight importance in western part of state. No observations made in eastern section. (Fromme, October 15).

South Carolina: Present. No data on damage. (Ludwig, October 15).

Louisiana: Very serious on the Triumph potato, probably reducing the spring crop in the neighborhood of fifty per cent. The 1921 condition has been published in Louisiana Experiment Station Bulletin No. 181. (Edgerton, October 15).

Arkansas: Very common, 15-20% of plants affected. (Elliott, October 15).
Ohio: See under leaf roll. (Clayton, October 15).
Indiana: A low percentage of the stand affected. Not considered a serious factor in Indiana. (Gardner, October 15).
Michigan: Probably, quite as usual. The mosaic in all early stock was easily overlooked because of the masking effect of the vigorous growth brought about by the season. In late Green Mountain potatoes, only one field was able to pass inspection which permitted no more than 4% mosaic. (Coons, October 15).
Wisconsin: Less than for several years. Practically none on Rural New Yorker. More in northwest than northeast Wisconsin. Small amount apparently tied up with a few aphis. (Vaughan, October 15).
North Dakota: Not found in the state this year to any marked extent. Not common to this state because of new land conditions and fair care in the selection of seed. Possibly to other conditions not known. Do not consider it a serious disease as yet, but it is being watched for. (Bolley, October 15).
Utah: Especially severe throughout the state. Many fields exhibited as high as 50-60%. No fields were found free. Cache and Boxelder Counties appear to suffer most severely from the trouble. It would be safe to state that Utah's crop was reduced from 15-25% from what appears to be the typical mosaic of the East. (Richards, October 15).
Idaho: Common in southern part of state, varying in degree from the mottled condition to the curly dwarf stage. Percentage of infection as high as 100% in some cases. Varies from trace to 100%. Present in every field inspected. (Raeder, September 1).

Scab caused by Actinomyces scabies.

The indications point to more scab than usual this year. Jones and McKinney reported (Phytopath. 10: 63, 1920) that 24° C. (75° F.) is about the optimum temperature for scab development; while 18-21° C. are optimum for tuber development. Therefore, in case there is more scab this year than normally, a very probable explanation may be found in the unusually high temperatures that have prevailed. Collaborators are asked to make a special investigation to determine the abundance of scab this year and its relation to the temperature factor.

Arkansas: Very much more severe than usual. (Elliott, October 15).
Ohio: Very little is done to check the infection, so that common scab is propagated from year to year and is always with us. The infection has not, however, been more than usually severe this season. (F. Detmers, October 15).
Indiana: Considerable soil infestation in old potato sections such as Lake County. Disease serious this year. (Gardner, October 15).
Wisconsin: More than for several years, apparently correlated with high soil temperatures. Two sulphur treatments (Bac-sul) gave negative results. (Vaughan, October 15).

Stem canker and black scurf caused by Rhizoctonia sp.

Indiana: In the early crop the cool weather favored the stem canker type of infection and resulted in many stunted plants and blanks in the rows.

Black scurf on tubers in late crop rather general. (Gardner, October 15).

Wisconsin: Less than for several years, apparently associated with high soil temperature. Seed treatments with corrosive sublimate proved very effective. (Vaughan, October 15).

North Dakota: Rhizoctonia is a disease which is becoming more serious in regions under more constant potato cropping. Our certification work has gone far enough to prove quite conclusively that it is transmitted by the seed to new lands. Our plot experiment work has gone far enough by seed treatment to prove that the corrosive sublimate method of handling seed on clean land will control it. At present it seems likely to be the chief bar to extensive potato registration and certification. Proper method would seem to be elimination through careful seed plot work extended to the field area. (Bolley, October 15).

Blackleg caused by Bacillus phytophthorus.

Indiana: Rather destructive on early crop in Indianapolis region. Affected a low percentage of the stand. (Gardner, October 15).

Utah: Blackleg appeared generally throughout the state this year on both the late and early crop. The greatest damage, however, occurred on the early crop and was especially severe in Davis and Salt Lake Counties. As high as 10% of the plants were diseased in some fields. (Richards, October 15).

Tip burn and hopper burn.

West Virginia: Widespread and destructive especially on early plantings. Many leaf hoppers observed in some cases, but unusual and continued heat seems to have caused greatest damage. Marked differences in severity were observed in same patch where some plants were shaded. (Giddings, (October 15).

Indiana: Not as severe as usual on late crop because of cool moist weather in August and September. (Gardner, October 15).

SWEET POTATO

The report concerning injury caused by white rust in North Carolina is of interest since this disease is usually of very little importance.

Stem rust caused by Fusarium spp.

Mississippi: The disease appears to be rather widely distributed over the state and from the inspections made by the State Plant Board, stem rot has increased or has been found more generally present than was thought to be the case. Fields are inspected through the growing season, and all diseased plants rogued. A plant grower must have his field inspected during the growing season in order to sell plants in the state. (Neal, October 15).

Louisiana: Very scattering in a few localities. (Edgerton, August 15).
Texas: Traces. Unimportant. (Taubenhaus, August 15).
Kansas: Approximately 50 acres plowed up in early season in Kaw Valley due to loss caused by stem rot. Other sections of the state remarkably free. From 1-10% of plants show infection at present in Kaw Valley. (Stokdyk, October 15).

Black rot caused by Sphaeronema fimbriatum.

North Carolina: Very common and destructive in the large potato growing sections. (Foster, August 15).
Texas: Very prevalent. Eight per cent loss. (Taubenhaus, August 15).
Kansas: Prevalent in fields where seed was untreated. Treated fields free. Caused loss of 5% of hills in early season. Shows up on roots in field at diggings. As high as 3% of roots unmarketable. (Stokdyk, October 15).

Scurf caused by Monilochaetes infuscans.

Mississippi: Present in about the same amount as last year. Widely distributed. (Neal, October 15).
Kansas: Common in fields that had heavy application of manure and in heavy soils. Two per cent of crop show scurf in lower part of Arkansas Valley. (Stokdyk, October 15).

Foot rot caused by Plenodomus destruens.

Kansas: Rare in Kansas. Three fields found. Loss about 1%. Not found in Kaw Valley. Present only in Arkansas Valley. (Stokdyk, October 15).

White rust caused by Albugo ipomoeae-panduranae.

North Carolina: Found in one section to be very destructive and causing considerable defoliation. This is evidently the first report of this disease causing considerable damage. (Foster, August 15).

CABBAGE

Yellows caused by Fusarium conglutinans.

The following reports indicate that besides causing serious losses, Yellows is becoming increasingly important and widespread in several states.

Ohio: Losses from cabbage yellows are increasing throughout the state from year to year, affecting seriously both the commercial and the private gardener. The disease is a definite limiting factor regarding acreage and varieties grown. (Thomas, October 15).

Very serious all over the state. In many cases in the southern part of the state plantings have been entirely destroyed. Yellows resistant varieties have stood up perfectly in all cases. (Clayton, Oct. 15).

Indiana: Remains the limiting factor in the cabbage growing industry in this state. Wisconsin resistant strains giving satisfaction in Lake County. (Gardner, October 15).

Illinois: Serious in many sections of the state, especially in home gardens. This disease is on the increase in Illinois. Many letters of inquiry received. (Anderson, October 15).

Michigan: Seventy-five acres cabbage about Charlotte, Eaton County, diseased. Loss serious. On seven acres loss total. This locality was free from cabbage soil trouble three years ago, but the disease has come in. The cabbage is drilled in the field and thinned, thus pointing to a seed source of the trouble. At present the disease is known from Branch, Kent, Monroe, and Eaton Counties. (Coon, October 15).

Wisconsin: More yellows than for several years associated with high soil temperatures. A new center developed near Beloit, Rock County. Many new fields in western part of Racine and Kenosha Counties. (Vaughan, October 15).

Kansas: Very common in numerous fields. Probably 30% of crop lost. Some fields were a total loss. This disease unquestionably is becoming more severe. (Melchers, October 15).

Montana: Of little economic importance but occurring quite generally where cabbage is grown. Loss, less than one-half per cent. (Morris, October 15).

Club root caused by Plasmodiophora brassicae.

Vermont: About as usual. (Lutman, October 15).

West Virginia: Mr. Sherwood also reports cabbage club root as severe in several gardens at Buckhannon in Upshur County. (Giddings, July 19).

Ohio: Club root has occasioned less loss this year than normal. (Thomas, October 15).

It is a serious pest in home gardens especially. (Clayton, October 15).

Indiana: Occurs in a few fields in Lake County and discovered this year in Elkhart County. (Gardner, October 15).

Wisconsin: A few new locations in Racine County this season. Seemed to be associated with wash water from higher infected fields. Causes little damage as a whole. (Vaughan, October 15).

North Dakota: Club root not commonly found in North Dakota. Though specimens have been found in previous years, none have been located this year. It attacks turnips, rutabagas, sometimes cabbage in this region. (Bolley, October 15).

Black rot caused by Bacterium campestre.

Apparently black rot has been less important than usual this year, although considerable damage is reported in a few cases.

Vermont: Noted, but of no importance this fall. (Lutman, October 15).

Florida: Cabbage black rot was reported from the northern part of the state. In several fields visited the damage was at least 10%. The disease was at its worst about March and April. (Burger, July 1).

Ohio: During early and mid-season periods very few cases of black rot were noticed. Coincident with the wet weather of late August to early

September, the disease was found to become more prevalent. Losses, however, are less than normal. (Thomas, October 15).

The loss from this trouble has been considerable. (Clayton, October 15).

Wisconsin: Less than usual although a few badly infected (75-99%) fields in Outagamie County. Evidently from seed bed infection. (Vaughan, October 15).

North Dakota: Cabbage production not extensive as yet in North Dakota, hence diseases such as black rot are not extensive, yet are to be found under old garden conditions. Samples may be seen each year and have been present this year in some of the older cropped garden plots. (Bolley, October 15).

Kansas: Slight amount in a few fields. (Melchers, October 15).

Montana: Local outbreak in Experiment plots at College farm which did considerable damage, resulting in loss of 20% of crop. No other report of its occurrence. (Morris, October 15).

Black leg caused by Phoma lingam.

It will be noted that all of the reports given below mention the seed as the source of infection.

Ohio: This disease has been observed causing very serious damage in a few fields. Infection in these cases obviously came from the seed. (Clayton, October 15).

Indiana: Occurred to a considerable extent on young plants in the market gardens early in the season. Apparently introduced with seed. (Gardner, October 15).

Wisconsin: Less than last year, although several fields in Outagamie County were 50-75% killed. Infection evidently from seed bed as portions of fields from different beds showed striking variation in amount of disease. (Vaughan, October 15).

COTTON

Fusarium wilt caused by Fusarium vasinfectum.

Louisiana: About the same as usual, though the loss does not seem to be as pronounced. Occurs commonly in the bluff and sandy soils. (Edgerton, October 15).

Texas: Prevalent in light soils. Three per cent loss. (Taubenhaus, September 1.).

Arkansas: General and severe, especially in eastern part of state. (Elliott, October 15).

Angular leaf spot caused by Bacterium malvacearum.

South Carolina: Present but damage less than usual. (Ludwig, October 15).

Texas: Very prevalent. One per cent loss. (Taubenhaus, September 1).

Oklahoma: The angular leaf spot has caused considerable damage to cotton about Stillwater. Considering the whole loss, namely, in stand, and leaves upon the yield, I believe the loss would be over 5%. (Stratton, Oct. 15).
Arkansas: Severe on bolls. (Elliott, October 15).

Anthracnose caused by Colletotrichum gossypii.

South Carolina: Present but damage apparently not great. (Ludwig, October 15).
Florida: There was very little in the state as a whole for the reason not much cotton was grown. From some localities the disease was severe. (Burger, September 1).
Texas: Abundant, 1% loss. (Taubenhaus, September 1).
Arkansas: More than usual in central Arkansas. (Elliott, October 15).

SUGAR CANE

Mosaic (cause undetermined).

According to the following report, mosaic has become generally distributed in Louisiana sugar sections.

Louisiana: Has spread rapidly so that it is present in practically all parts of the sugar belt. In the older infected sections, the infection runs in the neighborhood of 100%. In the Bayou Teche district, which is the last to become infected and which comprises the western portion of the sugar belt, the infection is as yet mostly scattering but in some cases as high as 10%. We have absolutely no information in regard to the loss caused by this disease. Some of the best fields in the state show nearly 100% infection. Yet there is no question but what the disease is reducing the tonnage to some extent. (Edgerton, October 15).

Root rot caused by Marasmius plicatus.

Louisiana: Considerable loss from root rot in various parts of the sugar belt. (Edgerton, October 15).

Red rot caused by Colletotrichum falcatum.

Mississippi: Reported from Pearl River County. Damage 5% in 12 acre field. (Neal, October 15).
Louisiana: Infection apparently not serious this season. (Edgerton, October 15).

Iliau caused by Gnomonia iliau.

Louisiana: Common in the northern and central parts of the state. Also found one rather serious infection in the extreme southern part of the state. (Edgerton, October 15).

SUGAR BEET

Leaf spot and the various root rots are reported rather generally as having caused losses in important sugar-beet growing districts. A disease which is apparently of the mosaic type has been found in Indiana.

Leaf blight caused by Cercospora beticola.

Ohio: Leaf blight has been present in the sections where sugar beets are grown and has caused considerable injury in Mercer County. (Young, October 15).

Indiana: Very destructive this year. Much worse in fields where sugar beets were grown last year. Also caused a severe blighting of garden beets. (Gardner, October 15).

Wisconsin: Abundant late in season but not apparently causing any damage. (Vaughan, October 15).

Colorado: Sugar beet prospect generally good. Some leafspot reported in the Arkansas Valley but damage not serious. (Bureau of Markets and Crop Estimates Crop Notes, week ending August 20.)

Utah: Leafspot has not become a serious factor as yet in Utah. Our survey shows it present in only one sugar beet district in and around Provo. This year, however, shows a gradual spread of the disease and it will be but a few years before it becomes generally distributed in the state. A number of fields in the Provo district were practically destroyed this year. (Richards, August 15).

Curly-top (cause undetermined).

Idaho: The Amalgamated Sugar Company lost enough stecklings to plant 200 acres of sugar beet seed due to curly-top. This year they planted 18 acres of these mother beets near Burley, Idaho for growing seed. In July these mother beets were plowed up as a total loss. It seems that curly-top beets will not grow and produce seed of commercial standards. Only 75% of these beets produced seed balls and not more than 10% of these produced seed. (Dean A. Pack, September 29).

Mosaic (cause unknown).

Indiana: What appears to be a mosaic disease has been found very prevalent in many fields. It is undoubtedly the same disease as that reported by Cunningham in 1899 in the Botanical Gazette as "a bacterial disease of the sugar beet." Specimens sent to Carsner, reported not curly-top. (Gardner, October 15).

Damping off mainly Fusarium spp.

Indiana: Caused heavy losses and much alarm early in season. Resulted in poor stands and in some cases failure to raise a crop. Heavy rains at time of thinning operation; thinning should have been postponed until damping off had completed its work. (Gardner, October 15).

Root rots caused by various organisms.

Indiana: Rather bad in a few fields. Apparently following injury of some kind and usually located at the crowns. (Gardner, October 15).

Utah and Idaho: Fusarium has been isolated from the rootlets and small tap roots of beets gathered in both Utah and Idaho by Dr. Rumbold of Washington and by Dr. Richards of Utah. In Utah Valley 5-10% of some fields will be destroyed. In northern Utah and Idaho except Logan Valley the loss may amount to 5%, as in these regions it just appears in small patches. In Logan district there are about 1000 acres that are partly damaged by Fusarium. (Dean A. Pack, September 29).

Utah: This particular rot which in its final stage shows the abundant occurrence of Phoma betae has caused serious losses in the state. No beet district was found entirely free from the trouble. Cache County appears to be especially hard hit and it is estimated that the crop has been reduced 25-30%. A large number of fields will not be harvested while others, due to the trouble, will not pay for the harvesting. The primary cause of this trouble has not been determined. Phoma betae at least produces the final stages of decay of the top root. One field man of the Amalgated Sugar Company estimated that 50% of the fields in his district of 2,000 acres showed the presence of the disease in a serious form. The trouble appears definitely to be correlated with the severe occurrence of seedling root rot in the early spring. This latter type or seedling rot was found to be more abundant this spring than in any previous season for which observations are recorded. (Richards, Aug. 15).

Utah: Dry rot canker has appeared in a rather serious form in Cache County, Utah. In addition to Cache and Davis Counties where the disease was found prevalent last year it has been discovered in several fields in Weber County. On the whole the disease appears to be slightly less severe than last year. (Richards, August 15).

DISEASES OF FRUIT AND NUT CROPS

PECAN

The following diseases have been reported from Mississippi by Neal (October 15):

Scab caused by Fusicladium effusum- Very prevalent in the Gulf Coastal section of the state. Severe on Pabst, Schley, and Success varieties. No information as to amount of damage, although where the above varieties were not sprayed timely the reduction in yield from scab is in many cases 40-60%.

Rosette (non-parasitic) - Several cases of pecan rosette have been observed in the eastern-central part of the state (Clark County), the Gulf Coastal section, and also here at the horticultural orchards. Not nearly so severe as has been observed previously by the writer in other states, especially Georgia.

Anthracnose caused by Glomerella cingulata. - Reported on Pabst pecans from Ocean Springs. Damage very slight.

Brown soot caused by Cercospora fusca- Present in many parts of the state and apparently on all varieties of pecans as well as seedlings. Damage slight.

Nursery blight caused by Phyllosticta curvea. - Present, especially in nurseries in southern part of state. Damage very slight.

Black pit (physiological). Reported from Lauderdale and Warren Countie

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UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE BULLETIN

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Vol. 5. November 15, 1921. Number 10

CONTENTS

This number of the Bulletin, with the exception of the index number (Number 11), will be the last of Volume 5 for 1921. A series of Supplements containing the annual summary of the plant diseases of the year will be prepared and issued during the winter and spring, and the regular numbers of the Bulletin will reappear in the early summer of 1922.

CEREAL CROPS

CORN

Smut caused by *Ustilago zeae*.

Reports have been received from states which have not reported before on corn smut.

New Hampshire: Very little in the state. Once in a while a diseased stalk or two in a field. (Butler, October 1).

Connecticut: About the usual amount. Dr. Jones' breeding plots showed certain strains quite resistant and others susceptible, and these characters seem to be inherited. (Clinton, October 1).

Florida: No complaints, but from observation would say there was very little this year. (Burger, October 1).

Texas: Very prevalent this year; 2% loss. (Taubenhaus, October 1).

Minnesota: First reported June 13 from Ramsey County. Generally present throughout the state. Reports vary from trace to 30% infection. Unusually severe. (Department of Plant Pathology, October 1).

Colorado: All of our seed is being selected from the standing stalks in the fields. We hope to reduce the percentage of corn smut by this method. The percentage of smut in our various varieties and selections is so great in many cases as to be almost unbelievable. Many rows show between 40 and 50% of smutted stalks. This is true of the varieties being grown at Akron from imported seed, as well as from our own varieties. A few of the strains which showed low percentages of infection in 1920 are giving some slight promise of having comparatively low percentages of smut infection this season. (F. A. Coffman, Cereal Courier 13: 245. October 20).

Ear rots caused by Diplodia and Fusarium spp.

All reports indicate a high percentage of decayed and moldy ears of corn in the central corn belt states. Much of this rot has followed the injury of the corn ear worm which has done much damage this year and which, according to the Insect Pest Survey of the United States Department of Agriculture has broken out in most corn sections east of the Rocky Mountains.

It is hoped that as many collaborators and readers of this Bulletin as can will make an effort to collect field data on the extent of damage from ear rots, and will also watch corn in crib and bin during the winter and spring to note the effects of the rots on the stored corn.

Ohio: Mr. G. M. Smith and G. N. Hoffer inspected the sweet corn fields set aside by the Sears and Nichols Canning Company at Chillicothe and Circleville, Ohio, on September 27. The fields were badly damaged by the corn ear worm and Fusarium mold. Practically no seed ears of any value were found. This condition, however, seemed to be representative of corn in that section of the state. (G. N. Hoffer, Cereal Courier 13: 231. October 10.).

Last year out of some 8,000 ears tested, 15-20% were found infested with these disease organisms. This year we have found in the testing work so far conducted, more than 50% of the corn diseased. (Clayton, November 12).

Indiana: A survey of over thirty fields of dent corn in the vicinity of Lafayette by Prof. H. T. Wiancke, R. S. Thomas, and G. N. Hoffer on September 29 has shown that between 15 and 20% of marketable-sized ears have been rendered unfit by the ravages of the corn ear worm, and Diplodia and other molds. (G. N. Hoffer, Cereal Courier 13: 231. October 10).

Illinois: There is much rotten corn this year mainly due to secondary infections by Fusarium moniliforme following the ravages of the corn ear worm and to ear rots caused by Diplodia zeae. The season has been unusually favorable for infections by the latter organism. Selections of Reid's Yellow Dent from this locality and from other places in Illinois are showing wide variations in susceptibility to ear rots. (J. R. Holbert, Cereal Courier 13: 241. October 20).

Minnesota: First reported June 13, Ramsey County. Root rot common in southern

part of the state, but not doing much damage seemingly. Ear rot common throughout the corn region. (Department of Plant Pathology, October 1).

Iowa: Corn, especially on low late planted fields in some localities is being damaged by corn ear worm and molding. (Bureau of Markets and Crop Estimates Crop Notes, week ending October 1).

After a survey in parts of Iowa, Illinois, and Indiana, I have placed the loss of corn from ear rots at 4, 8, and 10%, respectively. Diplodia zeae is responsible for about four-fifths of the loss. Various molds following ear worms and mostly restricted to kernels injured thereby or adjacent thereto are responsible for the remainder. (R. O. Cromwell, October 25).

Leaf stripe caused by Helminthosporium turcicum.

Connecticut: Present and causing some injury to leaves in late August and September, but not serious. (Clinton, October 1).

FRUIT AND NUT CROPS

APPLE

Scab caused by Venturia inaequalis.

The following late-season reports summarize this year's scab situation in a number of the states:

New Hampshire: Very prevalent on McIntosh. As injurious as last year. (Butler, November 1).

Connecticut: Most serious outbreak for some years. (Clinton, November 1).

New Jersey: Very abundant in some localities. (Cook, November 1).

Maryland: About the same as last year, 3.5% loss. Greatest loss this year was to the foliage where premature defoliation resulted. (Temple, November 1).

West Virginia: Quite prevalent in most sections of the state. It has not caused very heavy fruit losses in the state this year, but it has weakened many trees for production next year and is also producing much infectious material which will likely cause trouble next spring. It has been readily controlled in sprayed orchards and we have had fair success with dust. The general fruit crop is light. (Giddings, November 1).

Virginia: Very general on foliage. Growers are greatly alarmed at prospects of injury next season due to carry over of infective material. (Fromme, November 1).

North Carolina: Especially severe in mountain section, causing complete defoliation in cases where spraying was not practiced. (Foster, November 1).

Oklahoma: Widely distributed over the state. Observed at Kingfisher and at Stillwater. (Stratton, September 1).

Ohio: Leaf and fruit infections in unsprayed orchards very severe, yet excellent results were obtained in all cases where proper attention was given control methods. (Thomas, November 1).

Michigan: Apples remarkably free from scab. (Bureau of Markets and Crop Estimates Crop Notes, week ending October 1).

Wisconsin: No additional report of importance. There is a mild late infection of scab on fruit. (Vaughan, November 1).

North Dakota: Apple scab seldom occurs in this state to any large extent, for two reasons: (1) Generally speaking, apples are not extensively produced. (2) Atmospheric conditions are evidently not satisfactory for the growth of the apple scab fungus. It has not been collected by us this year. (Bolley, November 1).

Idaho: Scab has been very common in unsprayed orchards this year. More so than for three years. (Hungerford, September 1).

Blotch caused by *Phyllosticta solitaria*.

In addition to those given in previous issues of the Bulletin, the following reports of blotch have been received.

Maryland: More than usual. Loss 1.5% on account of hot dry summer. (Temple, November 1).

Oklahoma: Found about Stillwater. Cankers cause severe damage. (Stratton, September 1).

Ohio: Practically all of Ohio is in the danger zone except the north-east quarter. (Thomas, November 1).

Fire blight caused by *Bacillus amylovorus*.

Except in North Carolina, fire blight is at least no more prevalent than it usually is in most states, and in several is less abundant, according to the following reports. The statement by R. E. Vaughan concerning the attempted eradication in Wisconsin is of especial interest.

New Hampshire: Very scarce. Causes little damage. (Butler, November 1).

Connecticut: At least the average amount. (Clinton, November 1).

New Jersey: Less severe than usual. (Cook, November 1).

Maryland: Much less than usual. (Temple, November 1).

West Virginia: Has caused trouble only in occasional orchards and apple trees in town. (Giddings, November 1).

Virginia: Severe locally but not prevalent generally. (Fromme, November 1).

North Carolina: Common over entire state wherever apples and pears are grown. Probably more common this season because of lack of care the trees have received. (Foster, November 1).

South Carolina: Present, extent of damage unknown. (Ludwig, November 1).

Oklahoma: Quite common over the state. Damage slight. Damage to the pear has been severe this year. (Stratton, September 1).

Wisconsin: Blight control by eradication of Transcendent Crab and any other varieties with hold-over cankers is being undertaken by the community around Hatchville, Dunn County. Every farm owner within a radius of three miles has agreed to take out the offending trees. The Western Orchards Company has over 100 acres in young orchard and were chiefly instrumental in starting the work. The Wisconsin State Department of Agriculture and College of Agriculture are cooperating with the local growers. So far as known this is the first community in Wisconsin to undertake a comprehensive campaign against blight. (Vaughan, November 1).

North Dakota: Apple blight is usually very common in this state in proportion to the amount of apples under cultivation; the reasons being that the

growing season is short with intermittant rainfall on fertile ground, so that the early growths are apt to be too succulent, hence, this fire blight disease spreads rapidly from the buds to the tissues of such succulent growths. This year fire blight has been far less destructive than in most years. (Bolley, November 1).

Black rot caused by Physalospora cydoniae.

New Jersey: Very common. (Cook, November 1).
Maryland: About as last year; 5% loss due to early wet spring. (Temple, November 1).
Virginia: Very prevalent as result of general failure to apply sprays. (Fromme, November 1).
South Carolina: Slight infection reported by state crop pest inspectors in nursery in Greenville County. (Ludwig, November 1).
Oklahoma: Found about Stillwater. This disease together with the more severe blotch with the cankers are destroying several orchards near Stillwater. (Stratton, September 1).
Ohio: Late season investigations have revealed the fact that black rot has become very firmly established in southern Ohio, closely rivaling apple scab as the prevailing disease in that section. Twenty to thirty year old trees are being killed within one to two seasons. (Thomas, November 1).

Cedar rust caused by Gymnosporangium sp.

Florida: Some specimens of crabapple were sent in from Leon County where it is said that the rust was severe on one property. (Burger, September 1).

PECAN

Scab caused by Fusicladium effusum.

South Carolina: Quite common in the lower part of the state, but not reported thus far this season from the Piedmont section. (Ludwig, November 1).
Florida: Prevalent; more than usual, more than last year. Causing injury to foliage, fruit, and branches; most serious in June and July. Treatment: Spray with Bordeaux 4-4-50. (Burger, November).

Dieback caused by Botryosphaeria berengeriana.

South Carolina: Quite serious in one grove in Richland County, apparently following rosette. (Ludwig, November 1).

Dieback (cause unknown).

Florida: This has been reported from several places. It is believed that this is a symptom of poor nourishment. It was noted that on one or two places the soil was of a sandy nature and no fertilizers had been applied. (Burger, November 1).

Rosette (environmental).

South Carolina: Quite general. Probably more common than usual, owing to the unusually dry season. (Ludwig, November 1).

VEGETABLE AND FIELD CROPS

POTATO

Fusarium wilt caused by Fusarium oxysporum.

Ohio: Extremely prevalent, as revealed by harvested potatoes, both from home grown and northern introduced seed. In many cases associated with bacterial contamination, which results in a wet rot condition. (Detmers, October 15).

Minnesota: Did not appear in serious condition until September 1. About average amount observed. (Department of Plant Pathology).

North Dakota: Fusarial wilt appears to be the chief agent in bringing about stem end browning and entrance of rot by way of the fibrovascular bundles. It is probably our chief agent of bringing about soft rot in connection with bad storage. Seed plot and certification work by means of which carefully selected seed is procured through selection, stem-ending and corrosive sublimate treatment is meeting with success. It seems to be the road out for the control of the disease under potato cropping. (Bolley, October 15).

Idaho: Fusarium has caused but very little trouble in this state this season. We occasionally find a plant, which from appearance you would say was affected with Fusarium wilt but they were an exception rather than a rule. (E. R. Bennett, November 1).

Colorado: Very prevalent and extremely bad in many individual cases. (MacMillan, October 31).

Rhizoctonia caused by Rhizoctonia solani.

Minnesota: Of minor importance on tubers this year. Cleanest potatoes from Red River Valley observed for several years. (Department of Plant Pathology, July 1).

Colorado: This disease is very prevalent in the state. In some cases it has not permitted seed certification. I am unable to state the loss from the disease. (Learn, October 15).

As the season progressed Rhizoctonia developed and did about 15% of the total damage incurred in the district. (H. G. MacMillan, Oct. 31).

Idaho: Rhizoctonia was very serious. Weather conditions in the spring caused it to injure the plants when they were coming up and this injury continued in many districts sufficiently late to cut off a large percentage of the underground stems causing a light set of tubers. At digging time it has again showed up in the sclerotial form so that much of our stock has a high percentage of black specks. (E. R. Bennett, November 1).

Russet dwarf (cause unknown)

Idaho: Scattered throughout southern Idaho, but not present in every field. Percentage of infection varied from a trace to 35%. (Raeder, September 1).

SWEET POTATO

Foot rot caused by *Plenodomus destruens*.

Tennessee: General where sweet potatoes are grown, in some regions 33% affected. (Essary, Sherbakoff, & Hesler, November 1).
North Carolina: No reports of the occurrence this year but probably present. (Foster, November 1).
Florida: About the same as in former years. (Burger, November 1).

Stem rot caused by *Fusarium* spp.

Virginia: Reported from Norfolk and Eastern Shore sections in slight amounts. (Fromme, November 1).
Tennessee: Very common. One field, whole crop affected. (Essary, Sherbakoff, & Hesler, November 1).
North Carolina: Probably the most common and destructive of the sweet potato diseases, being found in nearly every field where proper methods for the control of it have not been in practice. (Foster, November 1).
Florida: About the same as in former years. Only two or three cases reported to this office. (Burger, November 1).

Black rot caused by *Sphaeronema fimbriatum*.

Virginia: Reported from Halifax County, Norfolk, and Eastern Shore sections. Said to be especially prevalent on late crop. (Fromme, November 1).
Tennessee: Common in state, but not serious at digging. Too dry. (Essary, Sherbakoff, & Hesler, November 1).
North Carolina: The most common of all tuber rots in the state, being widely scattered and causing considerable loss, especially in storage houses. (Foster, November 1).
South Carolina: Present, but damage apparently less than usual. (Ludwig, November 1).
Florida: In some beds in west Florida the disease was severe on young plants. The prevalence about the same as last year. (Burger, November 1).

CELERY

Late blight caused by *Septoria petroselini apii*.

Connecticut: No complaints and apparently not more than average amount. (Clinton, November 1).

New Jersey: Abundant and causing heavy losses. Spraying with 5-6-50 effective. (Cook, November 1).

Delaware: Very prevalent and causing considerable loss in patches not sprayed. White Plume variety very susceptible compared with Early Blancher, Winter King, and French Success. Infection confined to outer stalks as the crown has made very little growth because of drouth conditions. Bordeaux dust and liquid Bordeaux have proved equally successful in control of late blight with our demonstration work. (Adams, November 1).

Ohio: Presence of this disease has been noted, yet losses have been slight. (Thomas, November 1).

Early blight caused by Cercospora apii.

Pennsylvania: Observed as common in some of the commercial celery fields in the truck section outside of Philadelphia during latter part of July. (Haskell, July).

Connecticut: About the usual amount or less. Few reports and no complaints. (Clinton, November 1).

New Jersey: Abundant and cause of heavy losses. Spraying with 5-6-50 Bordeaux effective. (Cook, November 1).

Delaware: Very prevalent during August and first part of July. Following varieties found generally infected, Winter Queen, White Plume, French Success, Golden Self Blanching, Winter King, and Early Blancher. (Adams, November 1).

Yellows caused by Fusarium sp.- Minnesota: This disease is reported for the first time in Minnesota causing almost 50% loss in a three acre celery field in Washington County. (Department of Plant Pathology, November 1).

Root and heart rot associated with Fusarium sp. - Ohio: A form of root rot generally associated with a dry heart rot has caused considerable loss on one large celery farm. About 8-10 acres were not harvested. A species of Fusarium was consistently found associated with the condition in all sections of the infected area. This disease will be investigated further. (Thomas, November 1).

Soft rot caused by Bacillus carotovorus. - Ohio: Has occasioned quite severe losses for some growers. (Thomas, November 1).

Root rot caused by Bacillus carotovorus. - New Jersey: Very destructive, especially on muck soils. (Cook, September 1).

Damping-off caused by Sclerotinia libertiana. - New Jersey: Severe in greenhouses. (Cook, November 1).

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ERRATA AND EXPLANATION

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36 and 118 Onion, read "Fusarium malli" instead of "Fusarium mallii".

37, 65, and 88 Read "Bacterium tabacum" instead of "Bacterium tobacum" or "Bacterium tobaccum".

37 Read "Fusarium oxysporum nicotianae" instead of "F. oxysprium nicotianae".

38 Read "Tilletia laevis" instead of "Telletia laevis".

63 Read "Chrysophlyctis endobiotica" instead of "Chrysophylyctis endobiotica".

66 Read "Heterodera radicicola" instead of "Heterodera raidicicola".

74 Read "Polythrincium" instead of "Polythrincum".

113 Pear, read "Septoria pyricola" instead of "Septoria piricola".

140 Pecan, read "Phyllosticta caryae" instead of "Phyllosticta curyea".

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WHEAT

THE FLAG SMUT SITUATION

During May and the first half of June a survey for flag smut has been conducted in parts of Illinois and Missouri. The United States Department of Agriculture, represented by the Plant Disease Survey; the Illinois State Department of Agriculture; the Illinois Natural History Survey; and the Missouri Agricultural Experiment Station, have all cooperated in this work. Over 1200 farms were examined in Madison, St. Clair, Monroe, Jersey, and Macoupin Counties, Illinois, and in St. Louis and St. Charles Counties, Missouri, and as a result flag smut was found on about 226 of them. Approximately 283 of the farms inspected were within the quarantined area of last year and of these 155, or 55%, were found to harbor flag smut. The disease is so difficult to detect, when in small quantities, that it is impossible to make a definite statement that it does not occur on any particular farm. Outside of the 1921 quarantined zone, flag smut was found on 71, or 8%, of the 900+ farms inspected.

Distribution

As a result of the survey the area of known infestation has been increased from 72 to about 700 square miles. The disease has been found in Missouri where apparently it has been present for a number of years, and in two new Illinois counties, Jersey and Monroe.

The accompanying map shows the range of the disease as determined this year. It is very unlikely that all the outposts of infection have been located yet, as the short time for observation did not permit thorough scouting on the extreme edges of the areas.

Losses

In most of the infested fields the disease was present as a mere trace, only a few affected plants being found. In a small number of fields, however, an average of 2-3% was estimated and in limited areas in these and other fields as high as 30% flag smut was determined by actual count.

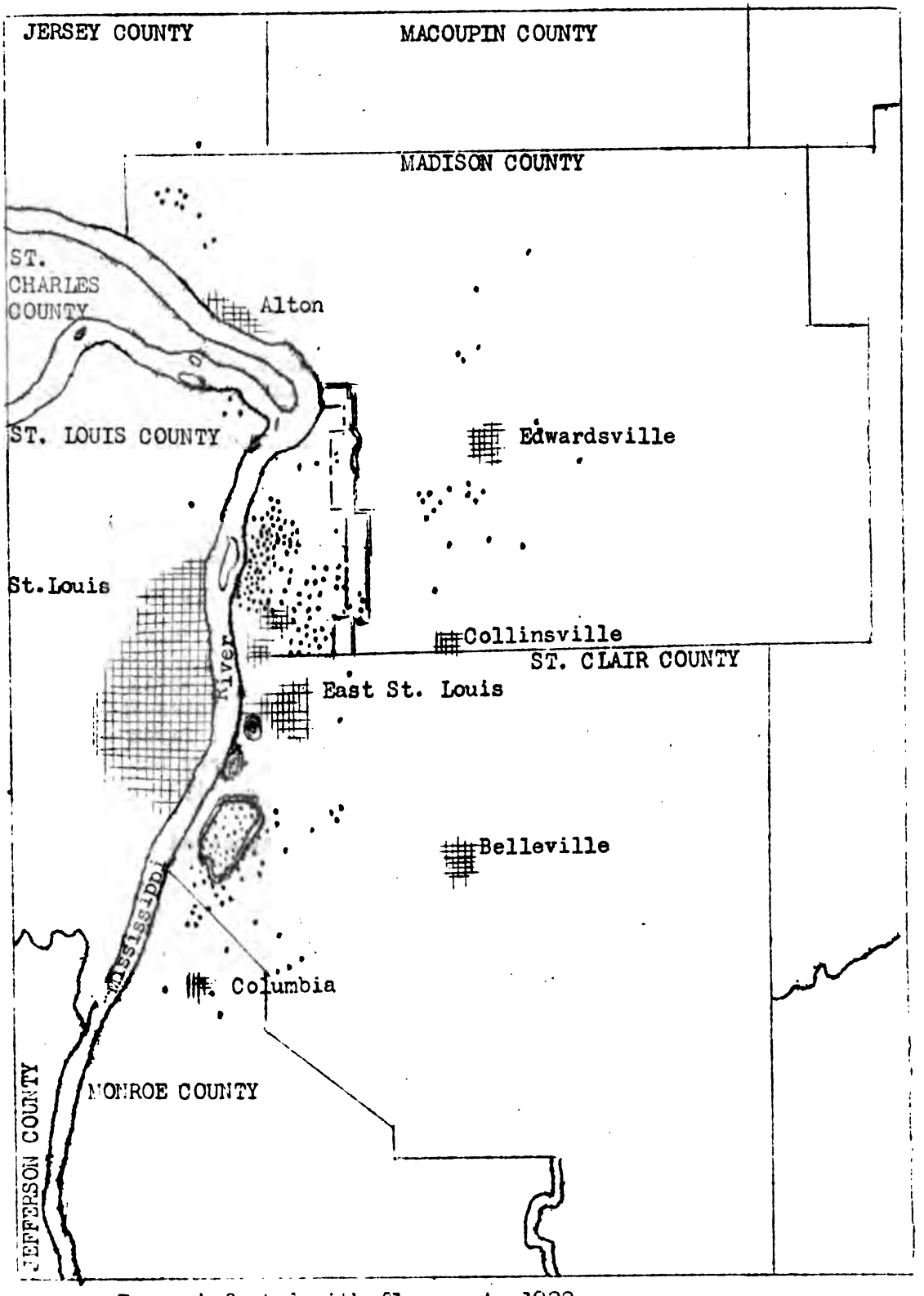
Dissemination of flag smut

The importance of the threshing machine in spreading flag smut spores was clearly brought out in the work of this year. An investigation of threshing circuits showed that when the disease was present on one farm it was very liable to be present also on others in the same circuit, especially those that were threshed either before or after the infested one. Instances of apparent transmittal by threshing outfits over considerable distances were found.

Numerous examples of dissemination of the organism by seed and by wind were also found. Evidence that surface water may be a factor in spread was obtained, but it seems improbable that flood water is of importance in this regard.

Wheat varieties

Within the quarantined areas of last year Red Wave and Turkey 10-110 were planted almost exclusively. The disease was all found in the Red Wave



. . . Farms infested with flag smut, 1922
— — 1920 quarantine line
——— 1921 quarantine line

Fig. 1. Present known geographic distribution of flag smut of wheat.

fields with three exceptions and in these it is probable that the Turkey was mixed with other varieties.

The Office of Cereal Investigations now has about 18 varieties of wheat that have not showed any flag smut, and also about 39 other wheats that have shown less than 1% flag smut, during tests covering 2 and 3 years. Among these varieties are a considerable number of very desirable wheats and several of them are well adapted to the infested regions.

Control program

The quarantine program of the Illinois Department of Agriculture will consist this year in the following, although it is understood that requirement Number 1 given below is still under consideration.

1. The requirement that all wheat produced within the area be milled into flour.
2. The restriction of wheat straw to the area.
3. The requiring of threshing outfits to stay within the quarantined zone.
4. The recommending of resistant varieties and the disinfection of seed wheat.

THE STEM RUST SITUATION

No reports of serious occurrence of stem rust (*Puccinia graminis*) have been received from collaborators to date. Neither have the state leaders of the barberry eradication work reported any serious occurrence on wheat. They have been finding the stage on the barberry during April and May and are now reporting spread from these infected bushes to grasses and grains in the vicinity. The following statement giving dates of first appearance and information regarding spread of the rust from barberry bushes has been given by H. D. Barker (Cereal Courier 14: 125, June 10, 1922.).

"Reports indicate that stem rust appeared on the barberries this spring as follows:

Ohio.....	April 11	Colorado.....	May 8
Nebraska....	April 21	South Dakota.....	May 9
Wisconsin...	April 29	Michigan.....	May 15
Minnesota...	May 5	North Dakota.....	May 22
Illinois....	May 6		

"Wheat growing near barberries was found infected with stem rust in Ohio on May 26. Rust spread from barberry bushes was found on susceptible grasses in Minnesota on May 26 and in North Dakota May 28. Reports from southern states up to June 1 indicate that the rust on grains and grasses away from barberries is probably now no farther north than central Missouri."

LEAF RUST OF WHEAT SEVERE AGAIN THIS YEAR IN THE SOUTHERN AND EASTERN STATES

Heavy infections of leaf rust (*Puccinia triticina*) have been reported again this year. On a recent southern trip, W. H. Tisdale found the disease

to be the worst that it has been for a number of years at Clemson College, South Carolina, and Auburn, Alabama. From Tennessee, Sherbakoff reported June 3 that the disease was very severe, affecting nearly 100% of the total leaf area, and in South Central Pennsylvania, Kempton and Humphrey found the disease to be very abundant in some cases. From Kentucky, Valleau reported May 9 that on that date very little leaf rust was shown. However, at the present writing the disease is probably plentiful in that state.

The men engaged in the flag smut survey in the Illinois counties across the river from St. Louis, found leaf rust to be very abundant, practically the entire leaf surface, including the uppermost leaves, was affected. In walking through the fields the men's clothing would become red with rust spores. Undoubtedly the disease caused considerable shrivelling of the grain in this region. It is true that dry weather at the time the wheat was maturing undoubtedly influenced the yield, but it would by no means have had so great an effect if the leaf rust had been absent.

WHEAT SCAB REPORTED FROM MARYLAND, TENNESSEE, AND KENTUCKY

In a trip to Charles and St. Mary Counties in Southern Maryland near the end of June, R. A. Jehle found wheat scab caused by Gibberella saubinetii in all the fields examined and was apparently becoming abundant in most of them. The disease was also occurring on the experiment station farm at College Park, Maryland, June 12. It is probable that wet weather during the week of June 4-10 was responsible for the infection.

From Kentucky, Valleau reports June 23 that scab is prevalent on wheat in all sections of the state, but losses probably average less than 1% at this time. Sherbakoff in Tennessee reported observing some scab in wheat on June 3, but no recent reports concerning this disease in that state have been received.

SEPTORIA GLUME BLOTCH

This disease caused by Septoria glumarum was found by Jehle to be abundant in fields in Southern Maryland, June 10. Wheat heads were so heavily infected that they appeared brown from a distance. Undoubtedly the disease is causing some loss, according to Jehle.

The disease has been reported to the Survey also by Sherbakoff in Tennessee and by W. H. Tisdale from Davis, California.

TAKE ALL IN NEW YORK AND SOME RESULTS OF RECENT EXPERIMENTS

The only report of the true take-all caused by Ophiobolus cariceti (O. graminis) occurring in the field thus far this season comes from New York where it is being found in a considerable number of fields in territory determined as infested last year.

R. S. Kirby (N. Y. Sta. Col. Agr. Dept. Pl. Path. and Ent. Weekly News Letter, May 29, 1922) reported the appearance of the disease in his experimental plot at Ithaca as follows:

"Symptoms of take-all started to appear on winter wheat in the test plot at Ithaca on about May 22. These symptoms consist in: The

arresting of the growth on the plants when they are from 6 to 10 inches high (soon after jointing); the plants become chlorotic and finally die. In the meantime bits of plate mycelium appear on the culm under the leaf sheath. Since the disease showed up in a part of the plot where soil and straw from a diseased field had been added, there is every reason to believe that the disease would appear at the same time and under similar conditions in the field."

H. H. McKinney working in the greenhouse with a pure culture of the fungus from Oregon, reported the following interesting results on infection and its relation to soil temperatures. (Cereal Courier 14: 22-25. Feb. 28, 1922.)

"With the assistance of Mr. R. J. Davis, graduate student in plant pathology, a preliminary soil-temperature experiment with Ophiobolus graminis has been carried on in the 'Wisconsin tanks'. Soil was inoculated with pure cultures of the organism grown from a single ascospore isolated from a diseased wheat plant collected near Corvallis, Oregon. This experiment shows that at favorable soil temperatures, the parasite produces a severe seedling blight and often kills the plant within 14 days after sowing. The greatest injury occurred in soil held at temperatures near 22° and 24° C. The characteristic blackening of the base of the seedling and the 'plate' of the mycelium are strikingly evident. Badly infected seedlings turn yellow just below the tip of the leaves and gradually the whole plant turns yellow and then a bronze color. Severe root rotting also takes place at favorable temperatures.

"The seedling blight symptoms produced by Ophiobolus graminis are strikingly different from those produced by Helminthosporium sativum and Gibberella saubinetii as well as from the first symptoms of false take-all."

WHEAT ROSETTE IN ILLINOIS

This disease (so-called take-all) was found in Madison County, Illinois this year only in experimental fields. It was reported, however, from Mason and Fulton Counties of that state by County Agent T. R. Isaacs (Mason County) who wrote G. H. Dungan at Urbana as follows:

"Relative to the take-all in this county, I sent out a card to all of our members on this side of the county recently, asking them what variety of wheat they grew, and whether or not they had any disease. As a result of this survey I have found the following: No one having Turkey wheat had the disease. No one having Red Wave wheat had the disease. One man having Salzer and Fultz wheat reported the disease; only the one man reported this variety of wheat. All but two men, who had Red Cross, reported having the disease.

"The take-all has been quite prevalent on this side of the county this year and is really serious in the bottom lands of Fulton County.

"I do not think scarcely any Red Cross wheat will be grown this fall, as a result of this survey."

The foot rot reported from Kansas last year began to appear again this season about May 10, according to a letter from L. E. Melchers.

A summary of the Kansas foot rot situation, showing that the disease is unlike either the true take-all or the rosette that occurs in Illinois, and also indicating that both Helminthosporium sativum and Wojnowicia graminis may be involved, has recently been given by H. H. McKinney (Cereal Courier 14: 113-114. May 31, 1922 (mimeographed).

Several cases of foot rot with the wheat dying in spots, were investigated by C. D. Sherbakoff, May 30 - June 1 in parts of Unicoi, Green, and Cooke Counties, Tennessee.

RYE

LOOSE SMUT CAUSED BY USTILAGO SP. REPORTED FROM ILLINOIS

Several specimens of this rather scarce smut were collected in the early part of May by men engaged in the survey for flag smut of wheat in Madison County, Illinois. The specimens were found occurring singly for the most part and in widely separated fields. So far as is known these are the first collections of this disease in the state.

ALFALFA

ALFALFA ANTHRACNOSE SERIOUS IN ARKANSAS AND MISSISSIPPI

Anthracnose of alfalfa, caused by Colletotrichum trifolii Bain, has been reported as destructive again this year in parts of Mississippi and Arkansas. In 1921 it was reported to the Survey only from these two states, but in each of them it did great damage through successive girdling of the shoots with resultant starvation and rotting of roots. In that year whole fields were plowed up and very little hay was cut in the badly affected regions. Regarding its occurrence this year the following statements have been received from collaborators:

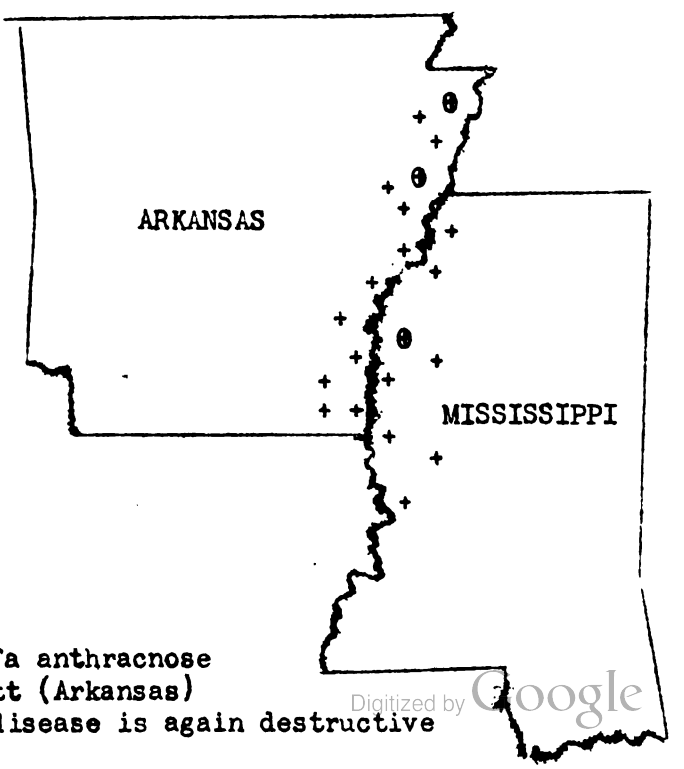


Fig. 2. Occurrence of alfalfa anthracnose in 1921 as reported by J. A. Elliott (Arkansas) and D. C. Neal (Mississippi). The disease is again destructive in this region this year.

Mississippi: This disease is perhaps the most important forage crop trouble in the Mississippi Delta. One planter in Bolivar County plowed up 1000 acres of alfalfa last season because of the extreme prevalence of anthracnose. It was also reported a number of times last year as well as this season in Washington, Leflore, Coahoma, Tunica, Yazoo, and Warren Counties as widely prevalent and causing the growers a considerable amount of alarm. (Neal, June 7).

Arkansas: Severe in some sections of eastern Arkansas this spring. (Elliott, June 23).

RED CLOVER

THE RED CLOVER POWDERY MILDEW EPIPHYTOTIC

In 1921 powdery mildew, apparently *Erysiphe polygoni*, appeared on the later crops of red clover in a considerable number of eastern states. It excited considerable comment among pathologists as it was very conspicuous, it occurred generally on red clover and heretofore it seems to have been only of rare occurrence. In fact the disease was entirely new to many people, numerous pathologists and agronomists making the statement that this was the first time it had ever come to their attention.

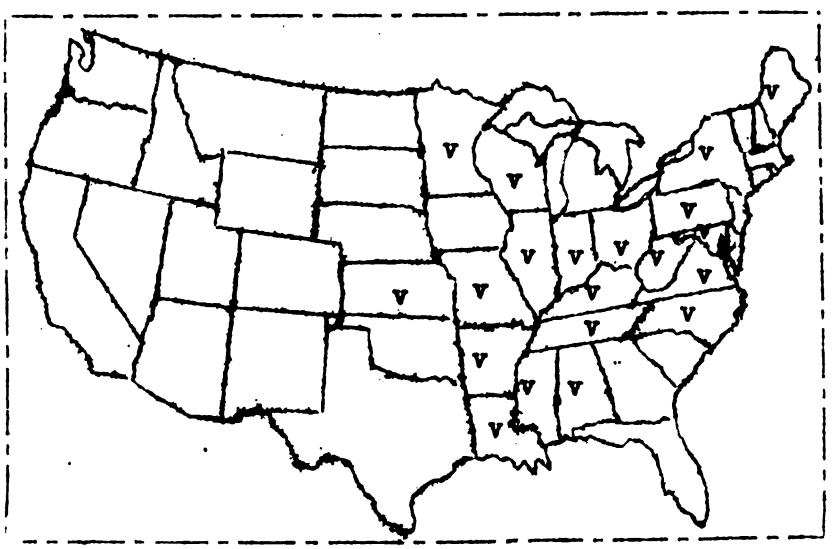


Fig. 3. Geographic range of powdery mildew or red clover as reported to the Plant Disease Survey, June 28, 1922.

In the spring of 1922 mildew began to be reported on the first crop of clover in the Southern States. The first complaint in Louisiana was April 10 according to Edgerton and in the latter part of that month and early May reports began coming in to the Tennessee Experiment Station. As the season progressed an increasing number of reports from collaborators in the southeastern quarter of the United States were received by the Plant Disease Survey at Washington until it was evident that the epidemic extended over the greater

UNITED STATES DEPARTMENT OF AGRICULTURE

Plant-Disease Survey Bureau of Plant Industry

July 7, 1922.

INFORMATION WANTED ON FIRE BLIGHT OF PEARS AND APPLES

For several years now fire blight of pears and apples has, for the most part, been on the decline. But, commencing about 1920, the disease began to assume more importance, and this season the reports thus far received, indicate that it is of considerably more importance than usual and that the situation may be of especial interest.

You will note in the Plant Disease Bulletin for July 1, 1922 that a severe outbreak has been reported in the important pear producing section of the Sacramento Valley, California, and that a high percentage of damage is being done to the crop in that region. You will also note that the second collection in sixteen years has been made in Maine. This would indicate that conditions in that part of the country are also especially favorable for the disease.

We have just received word from Wenatchee, Washington that a local epidemic is in progress there, pears being particularly affected, but the Spitzenberg apples also are being badly attacked. The outbreak is being vigorously fought by the horticultural inspectors and growers and doubtless it will be stamped out as have previous outbreaks in that section.

Other observations in the eastern states, including the vicinity of the District of Columbia, would indicate that blight is of more than normal importance. The information as a whole, however, is scanty and we are anxious to obtain further details concerning the present status of this disease. We are, therefore, asking you to report to us as soon as possible any information concerning this disease as it has come under your observation, or has been reported to you.

Very truly yours,

G. R. Lyman

Pathologist in Charge
Plant Disease Survey.

RJH-MO.

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portion of the East being most severe in the South and diminishing northward. At the present time, the disease does not seem to have attracted much attention in the North Atlantic or New England states, but specimens have been received from Maine and it is quite probable that as the season advances the disease will become more prominent in that section of the country.

In the regions most affected there seems to be little doubt but that the mildew has actually cut the yield to some extent by retarding growth and by causing death or shattering of leaves, particularly the lower ones.

The cause of the greatest concern on the part of farmers is the question of whether or not there is any danger of stock poisoning from feeding mildewed clover hay or from permitting animals to graze in affected fields. It seems very unlikely that the fungus would cause any ill effects but experimental proof is scarce. However, no cases of injury have been reported this year and furthermore the Tennessee Experiment Station has just completed a 14-day preliminary feeding and grazing experiment using horses, cattle, sheep, and swine, none of which showed any ill effects whatever. Some pathologists are recommending wetting the hay in case it is very dusty on account of the fungous spores. This would seem particularly desirable in the case of horses showing symptoms of heaves.

The name of this mildew is not known definitely, for as yet the perithecial stage of the fungus does not seem to have been found. Efforts should be made to discover the perfect stage this year and thus to settle the question of nomenclature.

This seems to be particularly a disease of red clover and its closely related form, the mammoth or sapling clover. However, crimson clover is reported affected in Louisiana and in Pennsylvania alsike was observed with mildew, although this does not seem to have been the experience in other places. There seems to be considerable variation in the susceptibility of different strains of red clover according to observations of a number of different persons. At the U. S. Department of Agriculture farms at Arlington, Virginia, A. J. Pieters observed that many of the American varieties of red clover were affected while most of the European strains were free.

More detailed reports by state collaborators and others follow:

<u>All States</u>: Regarding the occurrence of powdery mildew on clover, I find that we have 19 reports of occurrence - 15 supported by specimens; of these 5 were from Tennessee, 4 from Virginia, 3 each from Kentucky and Missouri, and 2 each from Maryland and Indiana. One correspondent from Wilmington, Virginia, reported that while red and mammoth clover were badly attacked, alsike clover and alfalfa were free. He also stated that the disease occurred in the entire county east of the Blue Ridge. Another correspondent at Cumberland, Maryland, reported alsike clover in the same field free from mildew. Most correspondents spoke of the disease being very general, one from Missouri reporting it 'on all clover in the community', another from Tennessee 'on clover generally', and another from Tennessee 'on all red clover, never seen before'. As to the amount of damage done, one correspondent from Virginia states that the 'crop will be practically a failure'; another from Kentucky stated that the disease had killed all the leaves. (W. W. Gilbert, Office of Cotton and Truck Crop Disease Investigations, June 29.)

New York: I have noticed considerable powdery mildew on clover. It is very common over the entire county but is more particularly severe outside of the lake plain. (Palmer, Field Assistant, Chautauqua County, June 26.).

Pennsylvania: Powdery mildew on clover has been reported this season from all over the state and is apparently unusually severe. Have seen specimens on mammoth clover, red clover, and alsike clover. (Thurston, June 27).

Maryland: I have seen mildews frequently in other clovers and various legumes (common or Japan clover), but this is peculiar in its abundance and being practically confined to red clover. Several samples and reports of its abundance have been sent us. It is apparently doing considerable injury. (J. B. S. Norton, June 13).

Virginia: The powdery mildew of clover is very prevalent and destructive in Virginia this year. The accompanying map shows the distribution as we know it to date, which indicates that it is expecially prevalent in the counties lying east of the Blue Ridge. We have had a great many letters from farmers amd most of them ask as to the use of hay made from such crops. We have no definite information on this point. The injury appears to be particularly severe on red clover but sapling clover (mammoth) is also affected. I think there is no question but that the mildew is doing a great deal of damage and that the death of the lower leaves is due directly to the attack of the mildew. The injury has been especially severe on the first cutting and we have been advising farmers to harvest the crop early in the hopes that the second cutting may escape severe injury. Such reports that we have to date indicate that the second cutting is not seriously affected as yet. (Fromme, June 13).

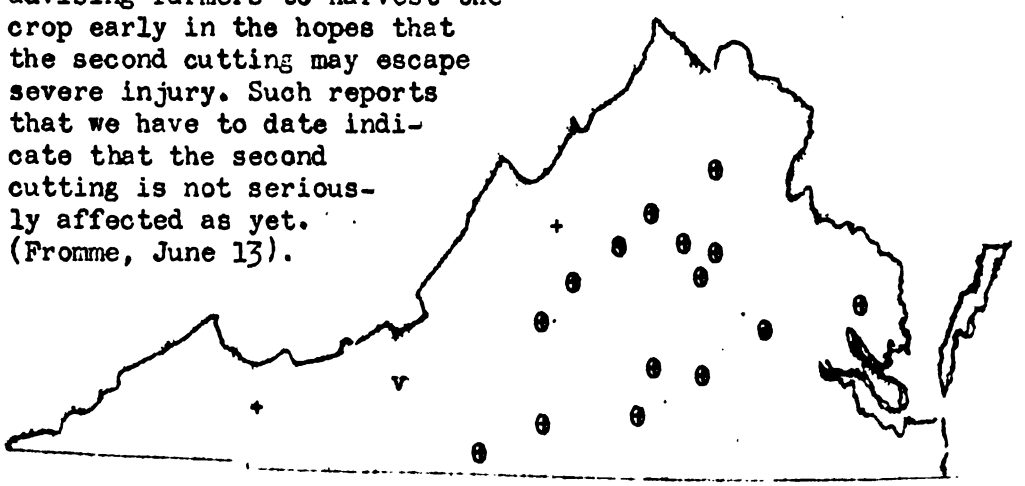

Fig. 4. Occurrence of powdery mildew on red clover in Virginia in 1922. First report May 11.

West Virginia: The powdery mildew has been extremely prevalent in all sections of West Virginia. It has been reported by people who feared that it might cause trouble to stock, and by others who were merely interested to know what it was. The powdery mildew of roses, apple, and red clover is more abundant this year than we have ever seen them. I know of no evidence that the red clover diseased with powdery mildew would cause injury to stock.

I am recommending that they take particular care in curing the hay before storing it. (Giddings, June 19).

Heretofore I have observed it on an occasional plant, mostly volunteer. This year it is generally abundant in and about Morgantown and reminds me of what I saw last autumn in eastern Connecticut. (Sheldon).

Kentucky: Powdery mildew of clover is being reported as a new disease by farmers from practically every section of Kentucky. In one case reported, cattle have refused to eat such clover but we have no other reports of this kind. It is difficult to say whether there is much loss due to it or not. Probably the actual yield of hay will be slightly reduced, although there may be some loss by stock refusing to eat the clover. (Valleau, May 31).

Clover mildew is being reported from all sections of the state as a new disease. It is questionable whether or not it is causing serious damage. (Valleau, June 23).

Tennessee: We have had a disease of clover called to our attention several times this year. It is powdery mildew, but so far we have seen no perithecia and hence are experiencing difficulty in determining same. Professor Essary says that he does not recall ever having seen the disease on clover before. In some cases it has evidently caused a good deal of damage. It seems to be general at least in East Tennessee, and I imagine it is also abundant in Middle Tennessee. (Hesler, May 9).

General and often severe. Tests recently made at the Experiment Station indicate that stock not injured when fed mildewed hay. Not observed on any but red clover thus far. No perithecia observed to date. (Hesler, June 23).

South Carolina: Red clover is not grown very extensively in this state and we have had no inquiries from farmers concerning injury of this crop by powdery mildew. I have noted it, however, a number of times on volunteer crops in various places. (Ludwig, June 15).

Mississippi: Powdery mildew is very prevalent in Mississippi this season. In fact, I have not been able to find a single patch of clover but what is not entirely covered by this disease. Isolated patches of red clover everywhere appear to have this mildew. At present, we have not had any complaint from farmers concerning any bad results when mildewed clover has been fed to stock. This may be due to the fact that not so much red clover is used for forage purposes in Mississippi as is the case with states further north. (Neal, June 16).

Louisiana: The disease has been extremely common this season in Louisiana on red and crimson clover. I am enclosing you a clipping from the Louisiana State University Press Bulletin of last week which describes the situation in this state. The first complaint was on April 10 and the disease is still very prevalent on what clover still remains in the field. (Edgerton, June 12).

"Louisiana clovers attacked by mildew. During the present season, there has been a serious epidemic of mildew on red and

crimson clover in Louisiana. Numerous complaints have come from the southern part of the state from Alexandria to the Gulf. The disease is very conspicuous in a field as the leaves turn white from the mildew growth on them. In some fields the disease has been so severe that the plants looked as if they had been heavily dusted with flour. This disease spreads very rapidly in a field when the moisture and temperature conditions are right. 'This is the first year that there has been any complaint from this disease,' says C. W. Edgerton, plant pathologist, experiment stations, Louisiana State University. 'Whether the trouble will stay with us and be a menace to the clover industry cannot be said at present. It may be that the present season has been very favorable for the disease, and if this is the case, it will possibly be of only minor importance another season. It is also possible that the disease is just gaining a foothold in the state and will be important every season.

'The mildew reduces the tonnage of the clover crop and will cause the hay to be slightly off color and of poorer quality. The affected leaves will not make as high quality of hay that healthy leaves will. Many of the affected leaves also die and become lost and the hay will show a higher percentage of stems. The disease, however, does not ruin the crop for hay. No poison or injurious substance is formed that would make the hay unfit for feed.'" (Louisiana State University Press Bulletin, June 8).

Arkansas: Powdery mildew of clover has been unusually severe in Arkansas this year, and has occasioned considerable loss to the clover crop. Farmers speak of its causing the clover to shatter and powder badly. We have received numerous inquiries as to its effect on stock, but have not received any information indicating that it had actually caused harmful effects. (Elliott, June 17).

Indiana: Mildew has been extremely abundant on red clover throughout the southern third of the state. Practically every field in the section of the state was white with mildew and we received a large number of inquiries as to whether or not it would damage the hay and whether or not hay would be poisonous to livestock. We have not seen any perithecia though we have made no special effort to find them. We sent out a news item sometime ago, saying that we could obtain no evidence that this mildew would be detrimental to stock grazing in the fields, or eating the cured hay. In cases where there seems to be any evidence that the foliage was being seriously injured by the mildew, we have advised early cutting. (Jackson, June 16).

Illinois: Mildew of clover has been reported to us from the following counties in Illinois: Calhoun, Champaign, Franklin, Gallatin, Greene, Jackson, Jefferson, Johnson, Macoupin, Marion, Massac, Monroe, Perry, Pike, Randolph, Richland, Saline, and White. The location of these counties indicates that the disease is well distributed throughout the southern half of the state. Heavy mildewing giving the fields the appearance of having been sprinkled with lime dust is common. Concerning the possible injury to livestock, I wish to quote from Farm Adviser C. M. McWilliams, Randolph County,

in his letter under date of May 29 says, 'My opinion is that it is not at all serious, because I have seen cattle pasturing on the clover and horses and mules that were fed on the young, newly cut, green clover and none of them are showing any bad effects whatever."(Dungan, June 13).

I spent three days among the farmers in St. Clair and Madison Counties, where this disease is unusually prevalent. I had a chance to talk to practically every farmer in that region so that I have some idea of their notions in regard to the trouble. The disease is so bad in that section that when the mower goes through the field a white cloud arises on all sides. In handling the hay, spores appear in clouds as though the plants were covered with dust. The fields look as though they had been sprinkled with flour or limestone dust. Red clover only is affected. In patches of white clover, sweet clover, alfalfa, and the little yellow clover which I believe is called hop clover, only the red clover shows any of the mildew. The farmers in that region are much alarmed concerning the trouble, especially what effect it will have upon the stock; also the effect it will have on the young clover which is now growing in the wheat. Those who handle the dried hay complain that the dust results in a stinging sensation in the nose and throat. ..... I heard no complaints as to the effect it had on the stock after they had eaten the affected plants. I assured the farmers that there would probably be no serious results provided the hay was allowed to cure thoroughly before being fed. I found no one who had fed the clover, since it was just being cut at the time, and of course it is a practice there as elsewhere not to feed freshly cut hay at this time of year. I found no evidence that the plants were being injured to any great extent. There was an especially fine growth of clover in that region due to the continued wet weather during the spring months. Of course, this also gave a chance for the development of mildew. (Anderson, June 12).

The clover mildew is abundant throughout Illinois and the conditions described in your special memorandum apply equally well in Illinois. It is especially notable that this season the epidemic has occurred on the first crop. We have heard that a disease or trouble similar to 'heaves' has occurred in the southern part of Illinois from the feeding of mildewed clover to stock. We have advised that some care should be used in feeding the hay until it became evident that the stock would not suffer. We have also advised the wetting of the hay before feeding in order to do away with dustiness. We find that the mildew, while widespread within the state, seems to be much more abundant southward, but there seems to be very little effect in the way of crop damage or interference with the proper curing of the hay. (Tehon, June 22).

Minnesota: We are finding this disease in epidemic form in Minnesota also. Within the past week, a ten acre field in Dakota County was found, in which 60 to 75% of the leaves were infected with mildew. A similar field also was found in Rice County about the same time. In both cases it was the first crop that was affected, and the disease does not seem to be doing very much damage to the plants. We have also found infected plants of red clover growing wild around the University within the past week. (Louise Dosdall, June 14).

Missouri: We are having an epidemic here of powdery mildew of clover on *Trifolium pratense*, and as the clover is being cut at the present time I am receiving a large number of inquiries as to whether the hay with this mildew on it is injurious to stock. (Hopkins, June 3).

Kansas: Mr. Dillenback, County Agent of Doniphan County, has just sent in some red clover covered with powdery mildew. He states that the whole field is similar to the specimen which he sent us and from that I judge it is a severe case of the mildew. I have looked at clover around Manhattan, but have been unable to notice any mildew. However, they surely have an epidemic in Doniphan County, but as yet I have been unable to find any perithecia of the fungus. (R. P. White, June 17).

APPLE

APPLE SCAB PLENTIFUL THIS YEAR

The reports on apple scab (*Venturia inaequalis*) received to date indicate that the disease is prevalent, perhaps unusually so in some sections. Collaborators report as follows:

Connecticut: Despite weather conditions that early did not seem to favor this trouble it has developed to a serious extent even on dusted and sprayed trees of the very susceptible varieties. (Clinton, June 23).

New York: Apple scab is prevalent everywhere but no unusual epidemics have been reported. (Chupp, June 23).

Pennsylvania: Unusually severe in Pennsylvania this year. Epiphytotic throughout the state. Defoliation taking place in many orchards. The apples also falling off due to early infection of scab on the petioles. Greatest damage of course in unsprayed or improperly sprayed orchards. (Thurston, June 27).

Maryland: This is the third successive season that apple scab has been bad. Prior to 1919 this disease did not seem to cause a very great loss in Maryland. It was always present but only to a slight degree, except an occasional local outbreak. (Temple, June 22).

West Virginia: Scab was reported May 4 and is quite prevalent in unsprayed orchards upon susceptible varieties. (Giddings, May 27).

Tennessee: Very abundant everywhere this spring. Wet weather and failure to apply "pink" spray seems to explain this condition. Scab continued to affect fruit chiefly; leaves not heavily affected except at higher altitudes. One commercial orchard shows almost certain loss of 75%. Especially bad on Mammoth, Black Twig, Winesap, and Delicious. (Hesler, June 23).

Arkansas: Severe on unsprayed fruit. (Elliott), June 23.

Illinois: Apple scab is causing unusual trouble this year. Both apple scab and apple blotch have been very successfully controlled by the standard sprays applied according to our spray schedule so there is no reason to believe that our schedules will not hold the diseases in check. (Anderson, June 12).

POWDERY MILDEW OF APPLE MORE ABUNDANT IN EAST THIS YEAR

Many reports of the occurrence of powdery mildew (*Podosphaera leucotricha*) have been received in New York, and in West Virginia the mildew is assuming epidemic form. Regarding its occurrence in the latter state, Giddings and Sheldon report as follows:

"Apple mildew was first noted April 8, and everything indicated more serious injury from this disease than has ever been noted previously. The disease was quite bad in the southern part of the state and is also being reported or sent in from practically every section."(Giddings May 27).

"Very abundant on a few trees near Morgantown. One tree in a pasture was covered so completely that the leaves had a silvery luster and were much curled and crinkled. This is the first time I have seen so much on large trees. The effect and appearance seems to be somewhat different from that usually occurring in nurseries. I shall try to secure perithecia." (Sheldon).

FROG-EYE LEAF SPOT WELL STARTED

Leaf spot caused by *Physalospora cydoniae* is reported as prevalent in Connecticut, New York, West Virginia, and Tennessee.

APPLE BLOTCH REPORTED FROM TENNESSEE, ARKANSAS, ILLINOIS, AND NEBRASKA

The following reports on apple blotch have been received from collaborators:

Tennessee: In epiphytotic form again this year. "Two-weeks" spray not properly timed. Oldenburg, Early Harvest, and Ben Davis worst affected; Yellow Transparent less. (Hesler, June 23).

Arkansas: Very severe on unsprayed fruit, especially in central Arkansas. (Elliott, June 23).

Illinois: Apple blotch appeared about two weeks ago in the southern part of the state and today it seems to be quite prevalent. (Anderson, June 12).

Nebraska: Blotch appeared very early and is abundant. (Goss, June 26).

WEATHER CONDITIONS FAVOR APPLE RUST

The following reports indicate a heavy infection of apple rust (*Gymnosporangium juniperi-virginiana*) this year:

New York: Apple rust seems to be more prevalent in the Hudson Valley than during the average year. (Chupp, June 23).

Maryland: This disease is showing abundantly in Maryland and many samples of it are being sent to State College for determination. It would seem that the disease may be unusually abundant this year from preliminary observations. (Jehle, June 12).

West Virginia: Apple rust appeared on May 6 and everything indicated an extremely severe infection upon susceptible varieties in localities where there are many cedars. (Giddings, May 27).

Tennessee: May 17: Pycnia present; no aecia. June 23: No aecia yet. Yates resistant. Disease general on leaves. (Hesler, June 23).

Arkansas: Very severe where cedars have not been cut. Most cedars have been removed from the commercial district. (Elliott, June 23).

PEAR

FIRE BLIGHT OF PEAR AND APPLE BAD THIS YEAR

New York, Delaware, West Virginia, and Kentucky report fire blight on both pears and apples as general and more common than usual; Tennessee as general and severe, as it normally is in that state, and Arkansas and Illinois as causing serious losses locally. In Delaware the disease was first observed in May and became prevalent since the rains at the beginning of June. There has been a severe epidemic of blossom and twig blight of apple throughout Kentucky, according to Valleau. West of the mountains in West Virginia twig blight caused a large amount of damage to apples, but it was probably not so important on the east side. The twig blight is most conspicuous on both hosts in Tennessee, but blossom blight of pear and leaf infection of apple are also common. In Arkansas the disease is severe on apples only near pear trees. Twig blight and fruit rot are severe in some localities, while other sections of the state have no blight at all, according to Anderson in Illinois.

On June 14, W. J. Morse of Maine reported as follows: "We recently received the second lot of specimens showing very characteristic fire-blight on apples since I came to Maine 16 years ago this summer."

W. S. Fields reported a very severe and disastrous outbreak of pear blight in the Sacramento Valley of California. Regarding it he gives the following: "I am told on fairly reliable authority that the damage (to the fruit) in some orchards will run as high as 60%. I understand that the outbreak has occurred within the past ten days and that many of the growers are working day and night in their efforts to cut out the blight in the trees, hoping to check the disease. The blight breaking out this late in the season (June 24) is very unusual, although the season has been backward and that ially accounts for it."

PEACH

LEAF CURL OF PEACH HAS BEEN COMMON

New York, Tennessee, and Arkansas report leaf curl (Exoascus deformans) as more severe than usual, and in Maryland and Illinois it is said to be bad in unsprayed or improperly sprayed orchards. It is prevalent in Delaware also, according to Adams. The disease was reported from the vicinity of Morgantown, West Virginia, by John L. Sheldon, and from Los Angeles, California by W. H. Tisdale.

BROWN ROT OF PEACH

Brown rot blossom and twig blight, caused by Sclerotinia cinerea, are reported from New York, Tennessee, South Carolina, and Illinois. Fruit rot is also being reported. Mature apothecia were first found in Delaware on April 10, and fruit infection on June 7. In Tennessee the blossom blight is said to be apparently not so severe as usual, but in Illinois the opposite seems to be true.

The following note by P. D. Rupert, a special field assistant of the New York State College of Agriculture, is of interest:

> New York (Wayne County): Brown rot infections are showing up in both cherries and peaches. The infections on the cherries have come from the mummied fruits hanging on the tree. These have been alive with spores. Infection in the peaches, however, has apparently come through the tiny canker on the limb at the base of a bud. The mycelium in this canker has grown up and killed the young growing bud and leaves and then spored from these. This infection is later than that on the cherries. No sporing mummies or perfect stage could be found on or around the peach trees. (P. D. Rupert, May 29).

CHERRY

BROWN ROT REPORTED FROM NEW YORK AND DELAWARE

New York reports infection of the blossom pedicels of cherries with the brown rot fungus (Sclerotinia cinerea) as more general and severe than usual; and in Delaware the disease is said to be very prevalent on sweet cherries.

GRAPE

REPORTS OF DOWNY MILDEW AND BLACK ROT

Downy mildew caused by Plasmopara viticola is reported from New York and from Tennessee, but is apparently not important except in the latter state at higher altitudes where both leaf and fruit infections are abundant.

Black rot caused by Guignardia bidwellii is reported from South Carolina and Arkansas as follows:

South Carolina: Disease severe in one vineyard in northwest corner of the state in spite of careful spraying schedule. Care was poor last year, however, thus furnishing an abundance of infective material. (Ludwig, Early in June).

Arkansas: Very severe on wild grapes and unsprayed cultivated grapes. Leaves, blossom clusters, and canes attacked. (Elliott, June 23).

STRAWBERRY

AN UNDETERMINED ROOT ROT OF STRAWBERRY SEVERE IN NEW YORK AND KENTUCKY

Root rots of unknown cause are reported by Chupp and Valleau from New York and Kentucky respectively.

New York: The root rot of strawberries has been reported already from six counties, and in a few plantings has resulted in almost a total loss of the crop. Isolations are being made to determine the fungus involved. (Chupp, June 23).

Kentucky: Root rot of strawberries caused practically complete loss of crop near Nicholasville. The plants grew vigorously, but at blossoming time the fruits failed to develop. The entire root system was found to be decayed, with the exception of a few new roots recently developed from the crown. (Valleau, June 23).

CITRUS

OUTBREAK OF CITRUS CANKER IN FLORIDA

The following note taken from the U. S. Dept. Agr. Official Record 1: 3. June 7, 1922, gives information concerning the recent outbreak of citrus canker:

"An outbreak of citrus canker, the much dreaded bacterial disease of orange and grapefruit groves, was discovered May 20 in a grapefruit orchard in an isolated section near Davie, Florida. As soon as specimens of the infected leaves were received at Gainesville, the State Plant Board force and department co-operators were sent to the spot and arrangements made for destroying the diseased grove. A corps of 25 experienced canker men were sent by the Florida Plant Board, with equipment for uprooting and burning all the infected trees. The trees are large and must be pulled out by tractors. Infection has been found on eight properties in the locality. The source of the present outbreak has not yet been determined."

CITRUS CANKER PREVALENT IN LOUISIANA

C. W. Edgerton in Louisiana reports citrus canker as being more prevalent than usual this season and spreading rapidly with little eradication work being done.

POTATO

LATE BLIGHT REPORTED FROM TENNESSEE

In March, according to A. C. Foster, late blight (*Phytophthora infestans*) was very prevalent and destructive, especially on the earlier potatoes, in the Sanford section of Florida.

C. D. Sherbakoff reports late blight from Fishery, Tennessee (June 3) where it was very severe on a field of volunteer potatoes, while very little was found in other fields, some of which were sprayed and some not. The volunteer potatoes, however, were at least several weeks older than the others Some severe cases of late blight were observed at Knoxville, also. This report is of peculiar interest as this disease has not been reported very frequently from Tennessee.

Collaborators are asked to be on the watch for this disease and to report at once any occurrences.

BLACKLEG OF POTATO

Blackleg was reported in February, by A. C. Foster, as causing considerable damage in a field planted with infected tubers at Federal Point in the Hastings section of Florida, but it was not at all general in the region. On April 24 the disease was reported as severe in one field of frost-injured potatoes in Arizona.

More recently the disease has been reported from New York (June 23), where field inspectors found from 1 to 3% in several plantings on Long Island, and from Tennessee by C. D. Sherbakoff, whose statement is quoted:

> "At Fishery I examined some fields of Irish potatoes and found the following:
>
> "Blackleg is worse than I ever thought it could be. In one field, about 2 acres, planted with Maine 'certified' potatoes of Spaulding Rose No. 4 variety, it is responsible in my estimation for destruction of at least 70% of the plants. I pulled out a considerable number of the affected plants and found blackleg alone and very severe in every case, so there is no doubt as to the cause of the damage. Next to these potatoes were Irish Cobblers not 'certified'. Blackleg there was about 4%. Practically none of it was found in the third field (Green Mountain)." (June 3).

HOPPERBURN NOTICED IN LOUISIANA FOR THE FIRST TIME

C. W. Edgerton reports (June 27) that typical hopperburn was observed for the first time in central and southern Louisiana, where it caused considerable loss. It appeared first at Hammond, on April 25, and was most injurious during April and May. Edgerton says:

> "This is the first time the trouble has been noticed in Louisiana. It caused some loss in some localities but fortunately did not start until the end of the season. In some fields the loss was as high as 10%. Leafhoppers were abundant."

Tipburn is said to be fairly common in Nassau County, New York. (H. C. Odell, June 12).

ROSE BUSHES IN RELATION TO POTATO MOSAIC

The attention of collaborators is called to a recent bulletin by Miss Edith M. Patch of the Maine Experiment Station[1] in which the importance of rose bushes to the potato mosaic and leaf roll problem in the northern states is clearly shown. The author states (pp. 340-342):

> "It is the belief of the writer founded on nearly twenty years collecting acquaintance with the pink and green aphid that this insect in Maine has but one primary host on which it normally overwinters - the rose. The most scrupulous quest for spring forms of this species on vegetation other than the rose was continued this spring during the entire time that this aphid was active on the rose. It was not taken on anything except rose until after the migration season had begun.
>
> "While it would be a rash thing to offer the pledge 'no rose bushes - no aphids', this bulletin would be without a point if it were not backed by the faith that the destruction of the primary host (the rose) of the pink and green aphid would cause the collapse of that species at least to the extent that it could no longer function as it does now (by virtue of its numbers and fairly constant occurrence), as probably the most serious carrier of potato mosaic. The writer knows of no case in the north where any species of aphid attains the economic status of a serious pest in the absence of its normal primary host. In the south it is possible for many species to maintain themselves by virtue of a continuous viviparous reproduction and the overwintering eggs play a less important role than in a cold climate where they are a necessary link in the annual cycle.
>
> "In the judgment of the writer and certain plant pathologists who have been watching the mosaic situation with reference to aphid infestation, there seems to be no guarantee for healthy potatoes in the vicinity of rose bushes. We know, from experimental evidence previously recorded that aphids can and do carry potato mosaic and leafroll; we believe, from a series of apparently convincing circumstantial evidence, that the pink and green potato aphid is the insect most concerned with the field transference of potato mosaic in northern

1. Patch, Edith M. Rose bushes in relation to potato culture. Maine Agr. Exp. Sta. Bul. 303: 321-344. Fig. 50. Dec. 1921.

Maine and northern New Brunswick; and we think that such evidence is of sufficient importance to warrant the recommendation that rose bushes, in the vicinity of commercial potato fields, especially where certified stock is grown, should be removed or annually de-aphidized.

"On the other hand while stressing the rose bush and the aphid, we are not to be interpreted as claiming that, in the elimination of the pink and green aphid, the problem of mosaic control has been solved. The possibility that certain other potato insects may be able to carry diseases should not be overlooked.

"But, the fact that there may be other insects guilty to a less extent of the same offense is obviously no argument against a campaign directed toward this aphid. That is, the possibility that a complete elimination of the spread of mosaic may not be attained is no reason for neglecting measures that promise to reduce such spread greatly."

In view of this important work, collaborators are asked to make observations as they have opportunity, on the relation between aphid-infested potato fields and rose bushes, and to determine whether there is any apparent connection between the severity and earliness of infestation of potato plants and their distance from roses.

TOBACCO

WILDFIRE CAUSED BY BACTERIUM TABACUM

Wildfire has been reported as occurring in seed beds in Connecticut, Pennsylvania, Maryland, and Kentucky. In Connecticut, due to control measures used and to weather conditions less favorable to infection, and in Kentucky, the disease is not so important as last year. In Maryland, however, wildfire is said by Temple and Jehle to be severe in parts of Prince Georges County, and in Pennsylvania Thurston reports: "Wildfire has broken out again in Lancaster County. Extent at present unknown, though its presence has been reported in several seed beds."

ANGULAR-SPOT CAUSED BY BACTERIUM ANGULATUM

Valleau reports angular-spot as widely distributed in Kentucky, but causing slight injury thus far. It seems to be less prevalent than in 1921.

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Take-all of wheat as reported from New York this year. (Pages 26-27)

Apple scab unusually prevalent in most states. (Pages 30-31).

Further reports on the fire blight situation given on pages 31-33. Readers are urged to send in notes on fire blight for the August issue of this Bulletin.

Anthracnose of apple caused by Neofabraea malicorticis does not occur in the Wenatchee or Yakima Valley sections according to D. F. Fisher. (Pages 35-36).

Coryneum blight of peach reported from Kentucky. (Page 37).

Outbreak of bean anthracnose in Mississippi. (Page 38).

Wildfire of tobacco appears in Wisconsin and is serious in other states this year. (Page 40). Persons located in tobacco producing states or sections are asked to send in any information they may have concerning the prevalence of this disease.

STEM RUST OF WHEAT IN TEXAS

SPRING WHEAT REGION NOT BADLY AFFECTED JULY 1

From Texas, J. J. Taubenhaus writes under date of July 7 that stem rust has been epidemic in the state causing a marked falling off in the wheat yield. The United States Bureau of Agricultural Economics reports that, "The yields in Texas are lower than had been expected, although the early fields were good", and estimates the condition of Texas wheat for July 1 as 55% as compared with a 10-year average of 78%. Specimens of badly rusted wheat have been received recently from Robert Stratton of Oklahoma, but a statement regarding the general situation in that state is not at hand. The general condition of the wheat in that state, however, was reported in the crop estimates as 63% on July 1.

From the spring wheat area the following reports have been received:

Wisconsin: Just commencing to show on winter wheat. At present confined to leaves. Observed at Marshfield and Ashland. Not serious now. (Vaughan, July 1).

Minnesota: Stem rust on wheat was first reported May 26 in Mankato, Blue Earth County. This was five miles from a heavily infected barberry planting and was possibly traceable to that source. Away from any known barberry infections. The first report was June 19 in Nicollet County. Stem rust is now general but light throughout the southern half of the state. (Department of Plant Pathology, June 29).

Missouri: Very little stem rust was reported in Missouri this year. None was noted in the vicinity of Columbia and only a few spot infections have been found in other places in the state. (Hopkins).

Nebraska: Slight scattered infection, much less than 1921. Wheat harvest earliest on record due to dry weather causing early maturing. (Peltier, June 26).

From the East, Fromme reports that in one field in Powhatan County, Virginia very severe injury occurred and that in the southwestern Virginia counties where *Berberis canadensis* is abundant, moderate injury to wheat is reported. The disease was first observed on wheat at Blacksburg, Virginia, May 29.

From Colorado, J. R. Fitzsimmons reported June 16 that only a very little rust had been found on either barberry or wheat.

THE LEAF RUST SITUATION IN MIDDLE ATLANTIC COAST AND UPPER MISSISSIPPI VALLEY STATES

Reports received from collaborators in South Carolina, Virginia, Maryland, and Delaware show that leaf rust (*Puccinia triticina*) was severe again as usual. It appeared later than last year but developed quickly prior to ripening, hastening maturity and cutting the yield. Adams in Delaware observes that rust did not become established last fall on the wheat as it did in 1921,

and Fromme reports that in Virginia it was slow in developing but came with a rush toward the end of the season. In Maryland, Temple reports that practically all the leaves were destroyed by the time the grain reached the milk stage and that the yield in the coastal part of Maryland will be cut greatly, while in South Carolina Ludwig noted the disease as unusually abundant and the cause of considerable damage.

From the Upper Mississippi Valley states the following reports have been received recently:

Wisconsin: Much more noticeable on beardless winter wheat than bearded selections at Marshfield and Ashland Branch Experiment Stations. Wisconsin # 408, which has been disseminated by the Agronomy Department shows a high degree of leaf rust resistance when compared with all other winter wheat selections grown. (Vaughan, July 1).

Minnesota: Leaf rust appeared during the latter part of May. It is now fairly general but rather light over the hard spring wheat area. On the winter wheat in the state it is unusually severe this year. In many of the fields of winter wheat the leaves are almost completely killed. (Department of Plant Pathology, June 29).

Iowa: Very common on both winter and spring wheat. (Melhus, June 26).

Missouri: This disease has been very severe this season, especially in the Missouri and Mississippi River bottom lands, and in some instances has appeared to be a factor in preventing the heads from filling properly. (Hopkins, July 5).

Nebraska: Leaf rust very abundant on wheat. (Peltier, May 31).

REPORTS ON LOOSE SMUT OF WHEAT

The following reports indicate that loose smut is present in about the ordinary amounts although the statements from Missouri and Nebraska show heavier infection:

Delaware: Very prevalent, May 16. (Adams, June 26).

Maryland: Common and prevalent about as usual, being present in amounts of from 1-5% in southern Maryland. (Jehle, June 12).

Virginia: About average in severity, general in untreated fields of bearded varieties, especially on Stoner. (Fromme, July 1).

Tennessee: Loose smut of wheat is about .5%. (Sherbakoff, June 3).

South Carolina: Noted in small amounts on station farm. Probably about as abundant as usual. (Ludwig, July 1).

Indiana: Today, in Potter County, I found almost no smut in some fields. The varieties included were Turkey Red, Red Wave, Red Rock, and Jones Climax. In Wabash County the smut is very prevalent, the

average being 8 to 10%. In the southern part of the state the disease is also severe. (Charles Gregory, June 9).

Minnesota: First report on June 16, in Anoka County and Rice County. On this date five percent infection was found on certain varieties. Other varieties showed only traces. Infection has now been reported practically throughout the state. Much variation in the amount of infection has been noted, about the average amount for the state at this time of the year. (Department of Plant Pathology, June 29).

Missouri: This disease was very abundant this year. Hot water treatments in several instances, however, gave perfect control. The first report of it was received on May 18. (Hopkins, July 5).

Nebraska: First observation May 29; heavier infection than usual. June 6, loose smut spores being disseminated abundantly. (Peltier).

MORE REPORTS OF WHEAT SCAB

For the past two years wheat scab (Gibberella saubinetii) has not been an important factor in the winter wheat regions, but reports received thus far indicate an increase in severity in the East this year. From Pennsylvania H. W. Thurston reports it as present in the most severe form since 1919 and occurring in widely separate localities of the state. In Maryland, Temple observes that it is more prevalent than last year being present in all fields and the cause of considerable loss in them. In one field 80% of the heads were infected. Fromme in Virginia writes that for the state as a whole the infection is very slight but some moderate injury occurred in the northern counties.

Less scab is reported by Hopkins in Missouri and a trace of the disease was reported in Minnesota June 24.

It is still too early to learn much of the effects of scab on the spring wheat crop.

SEPTORIA GLUME BLOTCH

Collaborators in Maryland, Virginia, and Kentucky report an abundance of glume blotch (Septoria glumarum) in the states. C. E. Temple writes that the infection is the worst ever observed in Maryland and F. D. Fromme reports that it was general and the cause of considerable injury, especially in the south-central portion of Virginia. W. D. Valleau reports the glume blotch as prevalent over the state and it was undoubtedly the cause of some shriveling of the grain. He observed marked difference in the amount of infection on different varieties. Records made on the varieties planted at the Kentucky Experiment Station for Dr. Mains are given by Valleau in Table 1.

Table 1. Susceptibility of wheat varieties to Septoria glume blotch at the Kentucky Agricultural Experiment Station, July 1, 1922.

	Variety		Variety
0	Alabama C. I. 5785	0	Malakoff, C. I. 4898
0	Beloglina P 758 C. I. 1544	0	Mammoth Red 52, C. I. 5587
+++	Big Harvest Fultz - Purdue	++	Mediterranean, C. I. 3332
+++	Diamond C. I. 5710	++	Mediterranean, C. I. 5614
0	Dietz Longberry, C. I. 5570	++	Mediterranean, C. I. 5834
0	Early Red Chief, C. I. 3582	++	Michigan Amber, Purdue
++	Eclipse, C. I. 5674	+	Michikoff, Purdue
0	Economy, C. I. 3397	+++	Missing Link, C. I. 4866
0	Egyptian, C. I. 3049	++++	Nixon C. I. 4867, Row 864
++	Farmer's Trust, C. I. 3346	++	Pennsylvania 44
0	Fulcaster, C. I. 3407	++++	Poole C. I. 3366
0	Fultz, C. I. 4809	++++	Red Cross Row 33
0	Fultz, Row 226	+	Red Hussar, C. I. 4843
0	Fultzo-Mediterranean, C.I. 5353	++	Red Rock, Row 1115
0	Gluten B 86, C. I. 3427	0	Red Wonder, C. I. 5817
0	Golden Wave, Row 85	+	Sibley New Golden, C. I. 3520
0	Harvest Queen, C. I. 5314	0	Squarehead Master, C. I. 3283
0	Hickman, C. I. 5313	0	Stoner (Miracle), C. I. 5665
0	Hybrid 10c 5-2-4 Purdue	0	Stoner, C. I. 5777
++	Ill. Chief, Purdue	+	Trumbull, C. I. 5657
+	Imperial Amber, C. I. 4860	+	Turkey Minn. 1549
+++	Jolly Farmer, C. I. 5858	0	Turkish Amber, C. I. 5829
+	Kanred P-762, Kan. 2401	0	Valley, C. I. 3376
0	Lancaster-Fulcaster, C.I. 3455	0	P-1066 Kan. 2415
0	Lebanon, C. I. 3456		

++++ Indicates severe infection. 0 Indicates very little or no infection.

TAKE-ALL LESS DESTRUCTIVE IN NEW YORK THIS YEAR

R. S. Kirby and M. F. Barrus have recently spent several days in the western New York wheat fields making observations on take-all (Ophiobolus cariceti). They examined wheat in some of the localities where the disease was prevalent last year with the following results:

Table 2. Take-all of wheat in New York State, July 3.

County	Total No. fields surveyed	No. fields with take-all	Average % killed by take-all	County	Total No. fields surveyed	No. fields with take-all	Average % killed by take-all
Cayuga	59	57	1.3	Orleans	7	1	t
Erie	1	1	.2	Seneca	3	3	4.3
Genesee	38	11	t	Tompkins	7	3	t
Monroe	1	1	t	Wayne	8	8	1
				Total	124	85	
				True average			.8

They report (July 3): "The killing during this wet year was less than last year but the diseased plants were not as badly dwarfed and many infected plants showed almost no symptoms. In one or two wheat fields O. cariceti was found on nearly every plant but the number of dead plants was very low. It was observed that most of the plants had one or two healthy culms with normal heads but that the other culms were dwarfed and dead and were infected with O. cariceti."

SEEDLING BLIGHT OF WHEAT IN MINNESOTA

"Reports of Helminthosporium on wheat seedlings have come in from several sources, in local areas particularly. In some fields in the spring wheat area it is quite severe. In some of these spots there appears the typical stunting and rosette appearance of the plant, together with considerable spotting of the leaves." (Department of Plant Pathology, June 29).

FALLING OVER OF WHEAT ONE OF THE OUTSTANDING FEATURES IN KENTUCKY THIS YEAR

Regarding this situation W. D. Valleau reports as follows:

> "In many sections of the state wheat died a few days before ripening and the straws bent over at the upper node. Badly shriveled wheat usually resulted. Varietal differences in susceptibility to falling were noticeable. Records of yields of fallen and erect varieties in variety tests are being obtained by Mr. Ralph Kenney. Mr. Kenney estimates about 15% of fields are injured seriously. Many fields not harvested."

ANTHRACNOSE OF WHEAT AND RYE

Thus far this year Anthracnose of rye (Colletotrichum cereale) has been reported from Pennsylvania, Ohio, Tennessee, Indiana, and Minnesota. On wheat collaborators report it only from the first two states where it appears to be unusually abundant. Regarding its occurrence in Ohio, W. J. Young writes:

> "This disease first attracted notice this season in the south-central part of the state, Pickaway County, where it caused premature ripening and failure to fill. A peculiarity of the attack on wheat was an infection of the nodes causing the weakening and fall of the straw. In northern and western Ohio only sporadic cases have been noted to date."

The members of the Botany Department of the Ohio Agricultural Experiment Station are making as many field observations as possible in an effort to get more detailed and reliable field data concerning the disease on wheat.

REPORTS OF STEM RUST ON OTHER CEREALS

Barley

Minnesota: First reported May 29 near barberry in Rice County. Infection is now fairly general but light excepting near infected barberry plantings throughout the southern half of the state. (Department of Plant Pathology, June 29).

Oats

Minnesota: First reported June 12, in Rice County near infected barberry. Infection is now fairly general, but light over the southern part of the state. (Department of Plant Pathology, June 29).

Iowa: Only a trace. First found June 23. Prospects are that it will do little damage because of its late appearance. (Melhus, June 26).

Rye

Minnesota: First reported June 3 in Rice County near infected barberry bushes. Several subsequent reports have come in for infected rye near infected barberry bushes. Some of these fields are quite heavily infected. Infection is not general on rye away from barberry plantings, except for one report from Freeborn where infection was reported to be fairly general but light. (Department of Plant Pathology, June 29).

LEAF RUST OF RYE

The only report of heavy infection of rye with leaf rust (*Puccinia dispersa*) is from Minnesota, as follows:

"First reported May 28 in Washington County. It is now general over the state and appears to be much heavier than usual. In many fields the leaves are practically killed and the telial stage is quite abundant." (Department of Plant Pathology, June 29).

INFLUENCE OF PLANTING DATE ON RYE ERGOT INFECTION IN WISCONSIN

"Striking influence of date of seeding shown on amount of ergot in Station plots at Marshfield.

September 1 - No ergot)
September 15 - No ergot) Stand thick in these plantings.
October 1 - No ergot)
October 15 - Heavy infestation of ergot. This planting thin, did not stool out." (Vaughan, July 1).

Report from Minnesota

"First reported June 12 in Dakota County. Heavy infection has been reported from Rice and Dakota Counties. Infection fairly general and widespread throughout the state, probably average amount." (Department of Plant Pathology, June 29).

STEM SMUT OF RYE IN MINNESOTA

"First reported May 25 in Rice County. Reports indicate that in Rice and Dakota Counties infection is widespread and fairly heavy. Some fields show ten percent infection."(Department of Plant Pathology, June 29).

TWO STATES REPORT ON BARLEY STRIPE (HEIMINTHOSPORIUM GRAMINEUM)

Wisconsin: More than for several years. May be associated with wet spring. (Vaughan, July 1).

Minnesota: First reported early in June. Infection has been reported from several counties but does not appear to be particularly heavy this year. (Department of Plant Pathology, June 29).

HALO BLIGHT OF OATS AS REPORTED FROM MINNESOTA

"Halo blight (Bacterium coronafaciens) was first reported May 26 in Rice County where the infection was fairly heavy. Another infection was noted in Anoka County on June 16. It seems to be unusually severe in certain fields this year." (Department of Plant Pathology, June 29).

IOWA AND MINNESOTA REPORT ON CROWN RUST OF OATS, PUCCINIA CORONATA

Minnesota: First reported early in June from several localities. It now seems quite prevalent throughout the state and is fairly heavy in certain fields. (Department of Plant Pathology, June 29).

Iowa: Only a trace. First found June 15. This is two weeks later than last year. (Melhus, June 26).

APPLE AND PEAR

REPORT ON SPRAY INJURY TO APPLES BY J. W. ROBERTS

"There was a moderate amount of spray injury particularly Bordeaux injury in the Northwest Arkansas orchards. It was not, however, unusually severe although it must be remembered that in years when leaf spot is especially prevalent it is often impossible to tell the difference between Bordeaux injured leaves and leaves infected with leaf spots. This is particularly true later in the season. In the vicinity of Maryland and Virginia there has been considerable spray injury due usually to over spraying. Most of the over spraying was due to the use of spray guns. The injury consisted of leaf spotting, leaf burning, and russet fruit, and in extreme cases the leaves were so badly burned and the fruit pedicels so badly injured by the spray that there was a heavy defoliation and heavy dropping of fruit. The spray gun, unless very carefully used, may cause a great deal of spray injury." (July 7).

APPLE SCAB UNUSUALLY PREVALENT IN MOST STATES

The following reports, received since the July 1 number of the Bulletin was issued, tend to confirm the impression that scab (*Venturia inaequalis*) is rather more abundant than usual this year.

Vermont: Noted well developed on leaves and some infection on the fruit on this date. (Lutman, June 12).

Massachusetts: The outbreak of apple scab has been fully as severe as that of 1921. As usual the McIntosh has been the hardest hit. Thorough spraying has resulted in practically perfect control in experimental orchards and in many commercial orchards. The pink bud and calyx sprays seem to be the most important. Liquid lime-sulphur, dry lime-sulphur, and lime-sulphur and Bordeaux, using the latter for the pink bud application, appear to have given equally good results. Dusting with sulphur or copper-lime dust also seem to be effective, and up to date the results look good for dusting in this state. (Osmun, June 28).

Connecticut: About as bad as last year and is as serious as in recent years. Most on crab apples and McIntosh; bad on Fall Pippin; less on Greenings, Wealthy, and Astrachans. (Clinton, July 1).

New Jersey: Very severe. (Cook, July 1).

Delaware: Very prevalent leaf and fruit infection May 10 and May 16. (Adams, June 26).

Arkansas: Scab was very plentiful as was expected because many of the trees were not sprayed last year, as there was no crop. Undoubtedly the lateness of the crop this year is in part at least due to the depredation of the scab last year. Last September Mr. Leslie Pierce of this Office sent in from Arkansas newly formed leaves of trees which had previously been defoliated by scab. These new leaves were also heavily infected, showing that the stage of development of the leaves is necessary for infection as are favorable weather conditions. (J. W. Roberts, Office of Fruit Disease Investigations, July 7).

Ohio: Following the limited application of fungicidal sprays last year, apple scab is noted to be much more serious the present season than usual, especially in southern Ohio, and difficult to control even where full spray schedules are being carried out. (Thomas, July 1).

Illinois: Generally distributed and more serious southward. Infection in orchards varying from a trace up to 20%. Infection varying apparently in accordance with the use of preventive measures. As a whole the damage is slight. (Tehon, July 1).

Minnesota: Mature perithecia were found May 5. First report of disease on new leaves June 8. Rather abundant. (Department of Plant Pathology, June 29).

Missouri: Apparently the scab has been rather light so far this season. Only one or two infections on leaves have been received. (Hopkins, July 5).

Kansas: More scab than usual. Prevalent in both Arkansas Valley section and Doniphan section. At present a 50% loss in unsprayed orchards and about 3-5% loss in sprayed orchards. (Stokdyk, July 1).

Montana: No observations. Few reports. Spring favorable for development, but the disease of no account except where spray schedules have been neglected. (Jennison, July 1).

FROG-EYE LEAF SPOT SERIOUS IN SOUTHERN OHIO AND ILLINOIS

Additional reports of leaf spot caused by *Physalospora cydoniae* have been received from Delaware, Arkansas, Ohio, and Illinois. The report from Arkansas and Illinois by Roberts and Tehon are of especial interest.

Connecticut: Bad on leaves. (Clinton, July 1).

Delaware: Leaf infection very prevalent on Transparent, particularly where old blighted twigs remain. (Adams, June 26).

Ohio: The spore discharge of black rot was noted to be coincident with that of apple scab. Serious defoliation reported from southern Ohio. (Thomas, July 1).

Illinois: Present so far mostly as leaf spot. Unusually abundant where treatment has been neglected. In many orchards 60% of the leaves on the trees are infected with a reduction of leaf surface varying from 5-30%. More serious southward. (Tehon, July 1).

Arkansas: The leaf spot form of this disease was more severe in Arkansas when I made observations in June than I have ever seen it any year in the fourteen years that I have been working on apple diseases. It was particularly severe on trees weakened by scale. (J. W. Roberts, Office of Fruit Disease Investigations, July 7).

ADDITIONAL REPORTS INDICATING UNUSUAL PREVALENCE OF FIRE-BLIGHT ON APPLE

Vaughan reports that fire-blight of apple, due to *Bacillus amylovorus*, is less severe this season in Wisconsin than it was last year, but in the majority of the other states, as will be seen from the following quotations, the disease is said to be more prevalent than during either last year or the average year. (See also under pear.)

Readers are urged to send in notes on fire blight for the August 1 issue of the Bulletin. Mail on or before July 20.

Vermont: Infection must have occurred a few days earlier as the trees were freely sprinkled with pronounced twig blight. (Lutman, June 12).

Connecticut: At least average year. Only three reports on apple, but more on quince and a few on pear. (Clinton, July 1).

Kentucky: Twig and blossom blight very prevalent all over state this spring. (Valleau, July 1).

Arkansas: Very severe especially on Jonathan and Maiden Blush in a blossom blight form. Mr. Leslie Pierce of this Office estimated that 50% of the Jonathan bloom was killed by blight. (J. W. Roberts, Office of Fruit Disease Investigations, July 7).

Illinois: Generally distributed throughout the state but not abundant or severe. Some damage has resulted from blossom blight and some also from twig blight. Several instances have come to our attention where new infections have developed from holdover cankers. (Tehon, July 1).

Wisconsin: This disease observed in several orchards in northern Wisconsin (Dunn, Bayfield, and Ashland Counties). Not seen near Madison. Not as bad as last year. (Vaughan, July 1).

Minnesota: Fairly abundant. More than last year. First reported May 27. (Department of Plant Pathology, June 29).

Missouri: Fire blight has been worse this year on apples than last season. There has been an especially bad epiphytotic of blossom and spur blight. (Hopkins, July 5).

Kansas: Prevalent all over Kansas. Unusually severe for this state. Damage estimated at 10%. (Stokdyk, July 1).

Montana: The blight is worse this season than it has been for several years. The spring was cold, rainy, and generally backward; much succulent growth resulting. In susceptible varieties, like the Transcendent Crab, Alexander, etc. the blight's ravages are particularly severe. Estimate crop will be damaged to extent of 25% or more. (Jennison, July 1).

FURTHER REPORTS CONCERNING THE PEAR BLIGHT SITUATION IN CALIFORNIA

W. T. Horne states that pear blight was not reported this year from the coast districts of central and northern California, but that it occurred in the hotter interior portion of Napa County and was reported severe in the Sacramento Valley, which is the principal interior pear-growing section of the state. According to D. G. Milbrath (July 5), the disease is more severe than it has been for several years. It occurred in every pear orchard in the

central part of the state and in most orchards in the southern part. Young trees suffered most severely, which fact makes it more difficult to estimate losses, as such trees would naturally bear only a small crop, but it is certain that the large amount of cutting away which will be necessary will affect next year's production. The lowest estimate of loss that has been made by growers is 5%, while in some orchards it is at least 40%. Milbrath estimates an average loss of at least 15% for the state. However, in spite of the exceptional severity of the outbreak, Milbrath thinks that the control measures which are being generally used will be reasonably successful.

PEAR BLIGHT REPORTED FROM OTHER STATES

Texas: Epidemic on pear and apple this year, causing twig blight. Ninety percent of the crop lost from cool, wet weather during pollination, resulting in blossom blight. (Taubenhaus).

Ohio: Fire blight has been serious on pear although delayed, developing after blooming, twig infections on all kinds attacked, making it less conspicuous on apple than on pear. The distribution is over all pome fruit districts, and may be followed by severe later season killing of tree and branches. (Selby, July 1).

Missouri: The blight has been probably much worse on pears than on apples. It seems to be well distributed throughout the state. Frequently whole trees would be blighted. (Hopkins, July 5).

Arizona: Fire blight reported on pear from Yuma and Gila Counties. (Brown, June 20).

Washington: Heretofore, this district (Wenatchee) has had no domestic bees and not very many wild bees ever were in evidence during the blossoming season. However, this year several orchardists brought in bees. Shortly after the blossoming season blight began to be reported and it is now bad on the places where bees are kept, being worse there than on neighboring orchards. Pears seem to be affected most, although Spitzenberg apples are also hit hard. The outbreak is being fought vigorously by the horticultural inspectors and doubtless will be stamped out the same as previous ones. The disease has always been under control here and for the last seven years only sporadic outbreaks have been noted, all being promptly handled. (Fisher, June 30).

IMPORTANT BLOTCH REPORTS

The following reports of apple blotch (*Phyllosticta solitaria*), together with those quoted in the preceding issue of the Bulletin, indicate that the disease is abundant in unsprayed or improperly sprayed orchards in several states:

Delaware: Very prevalent this season on Transparent, Red Astrakhan, and Dutchess. First infection of fruit observed June 7 and leaf infection June 26. (Adams, June 26).

Arkansas: Blotch appeared on the fruit unusually early, but orchards which had recent applications of Bordeaux beginning two weeks after blossom fall were free from the disease. (J. W. Roberts, July 7).

Illinois: Present through most of Illinois, but much more common southward. The disease is held in check in practically all orchards where recommended spraying schedules are employed, but elsewhere most of the twigs on the trees are being killed and as high as 50% of the leaves and 60% of the fruits show infection. (Tehon, July 1).

Missouri: First report of this disease was received June 6. It does not seem to be very severe at present. (Hopkins, July 5).

Kansas: Severe in unsprayed orchards, in some cases a total loss of marketable fruit. Sprayed orchards 1-2% loss. Average loss for the state about 20%. (Stokdyk, July 1).

BLISTER CANKER IMPORTANT IN ILLINOIS

During May blister canker (*Nummularia discreta*) was found on Ben Davis apples in Columbia County, New York. The disease is also reported from Illinois and Kansas, as follows:

Illinois: Prevalent through most of the state and seems to be increasing in abundance. More reports of the presence of this disease and more requests for information concerning its control have appeared this year than in any previous year. (Tehon, July 1).

Kansas: Practically every orchard in Kansas has infected trees. Some orchards show 50% damage. (Stokdyk, July 1).

BITTER ROT REPORTED FROM NEW JERSEY, DELAWARE, TENNESSEE, AND ARKANSAS

Hesler reports (June 23) that in Tennessee bitter rot (*Glomerella cingulata*) is abundant on early varieties in some localities where spraying was not properly done. The variety Jefferis is very susceptible; and a small amount of rot was showing June 16 on Ben Davis. In Arkansas, Roberts reports that the disease had secured a strong foothold on June 20 and that with weather conditions at all favorable to the fungus this will be a bad bitter-rot year. In New Jersey cankers were found in a young orchard; in Delaware it was reported on the fruit of Maiden Blush.

ADDITIONAL REPORTS ON APPLE RUST

Reports concerning apple rust (*Gymnosporangium juniperi-virginianae*) that have been received to date, including those quoted in the preceding issue

of the Bulletin, indicate that east of the Mississippi the disease is rather general and in some states severe. In Missouri and Kansas apparently it is unimportant, although a few reports were received. Other states report as follows:

Connecticut: At least average year. Wealthy most affected. (Clinton, July 1).

Delaware: Very serious outbreak this season. Leaf and fruit infection on Transparent May 24. Jonathan, York Imperial, and Stark show severe leaf infection. (Adams, June 26).

Kentucky: Reported as severe from several stations of state. (Valleau, July 1).

Arkansas: In Arkansas the varieties Oliver (Senator), Jonathan, and Rome showed moderate infections but this section shows very plainly the effect of cedar removal as compared with seven and eight years ago when the writer was in Arkansas. (J. W. Roberts, July 7).

Illinois: Present especially southward and westward. On the whole infection very light on the leaves and none on the fruit. Several cases, however, have come to our attention where a reduction of 70-100% in leaf surface has occurred where the orchards are growing near cedar trees. In most of these cases it appears that the leaves will fall prematurely resulting in some damage to the trees and to the fruit. (Tehon, July 1).

Minnesota: Sporulating galls first observed on May 27 on red cedars. Pycnia on apple leaves observed June 14. (Department of Plant Pathology, June 29).

POWDERY MILDEW PREVALENT IN DELAWARE

Powdery mildew (*Podosphaera leucotricha*) of apple is usually more important in certain sections of the West than it is in the East. This year, however, it seems to be of considerable importance in some of the eastern states; while a report from D. F. Fisher (June 30) states that in the Wenatchee district of Washington the disease has been almost entirely controlled except in a few orchards at higher elevations, by hot dry weather and rather general spraying. The worst case noted in that section was in one orchard with an overhead irrigation system. J. F. Adams reports that powdery mildew is prevalent on Transparent, Stayman, and Jonathan apples in Delaware (June 26).

NORTHWESTERN ANTHRACNOSE IN WASHINGTON

According to D. F. Fisher, apple anthracnose (*Neofabraea malicorticis*) does not occur in the Wenatchee district or the Yakima Valley and other districts east of the Cascades in Washington. The decay which markets inspectors have reported as anthracnose rot on apples from these sections, and which was reported in the recent summary of diseases of fruit in 1921 (Pl. Dis. Bul.

Suppl. 20: 40-41. June 10, 1922) is not due to the anthracnose fungus, although in appearance it is similar to anthracnose rot. Fisher says:

> "In over nine years of continuous orchard work throughout this district (Wenatchee) I have never observed a single occurrence of this disease here, either as tree canker or fruit rot, nor have I been able to find anybody who has seen it here or in the Yakima Valley. It seems improbable to me that so much could be found on market fruit and everybody here be ignorant of it or that with so much being found on the fruit none of it occurs as tree cankers.
>
> "Dr. Heald of the Washington Experiment Station told me last summer when we were discussing the matter that his information is in entire agreement with mine in this respect.
>
> "The disease is very common west of the Cascades, where climatic conditions are recognized as being entirely different. The fungus to which reference is made in the inspection reports is one which is entirely distinct from Neofabraea, although the rot caused by it has something of the appearance of anthracnose rot. Thus far I have been unable to get this organism to sporulate and it is not identified. I have sent cultures to both Dr. Heald and Professor Barss of the Oregon Station, who support my contention that it is not Neofabraea."

PEACH

BROWN ROT OF PEACH

In southern Illinois blossom and twig blight of peach caused by *Sclerotinia cinerea* were unusually severe this spring according to Anderson and Tehon. The heavy spring rains favored this form of the disease, which is not ordinarily so important in Illinois. Blossom blight is often a serious factor in the states along the Atlantic Coast but the usual weather conditions at blossoming time in the Central States, as a rule, are not so conducive to brown rot.

New Jersey reports twig blight, and Virginia, Kentucky, and Kansas fruit rot. J. W. Roberts states that it has not yet been a serious factor in Georgia. In the Fort Valley section spraying has been general, and the fruit has been more free from rot than for several years.

ADDITIONAL REPORTS ON LEAF CURL

Reports from Kentucky, Ohio, Illinois, Missouri, and Kansas state that leaf curl has been prevalent, and in Ohio, Missouri, and Kansas it was unusually severe. Connecticut reports less than the usual amount.

BACTERIAL SPOT PREVALENT

Bacterial spot (*Bacterium pruni*) is reported to date from New York, Delaware, Virginia, Kentucky, North Carolina, Mississippi, Illinois, and Kansas.

In Delaware it is causing severe defoliation of unfertilized trees. According to J. W. Roberts it is less serious than usual in North Carolina this year, due probably to the more general use of fertilizers. In Mississippi, on the other hand, it is said to be more prevalent than usual, and in Illinois it is generally distributed and important, and seems to be commonly associated with scab, according to Tehon. In Kentucky it caused severe damage for the first time in the Station orchard.

SCAB IMPORTANT IN NEW JERSEY, ILLINOIS, AND KANSAS

New Jersey: Severe on leaves, causing shot hole. (Cook, July 1).

Illinois: Widely distributed throughout the state, but much more severe southward. In most all orchards all trees are infected and there may be noticeable depreciation in the value of the fruit. (Tehon, July 1).

Kansas: Present in most orchards. Damage will run 5% or more. (Stokdyk, July 1).

CORYNEUM BLIGHT REPORTED FROM KENTUCKY FOR THE FIRST TIME

"This disease is causing serious damage in two peach orchards in Breckinridge County. It is the first report of the disease in Kentucky." (Valleau, July 1).

CHERRY

LEAF SPOT EPIPHYTOTIC IN THE EAST

Leaf spot (*Coccomyces hiemalis*) is apparently epiphytotic and is causing considerable defoliation in central and southeastern Pennsylvania, in Ohio especially where control measures were neglected, and in Illinois, where according to Anderson it is especially serious on sour cherries in the southern part, although unusually severe throughout the entire state. The disease is also reported from New York, and from Delaware, where it is said to be common on both sweet and sour cherries.

PLUM

PLUM POCKET APPARENTLY MORE ABUNDANT THAN USUAL

Reports indicating unusual prevalence of plum pocket (*Exoascus pruni*) have been received from New York, Minnesota, Iowa, Missouri, and Nebraska, and in these last three states it is said to be both abundant and severe, in Missouri especially so on the Wild Goose plum. J. W. Roberts of the Office of Fruit Disease Investigations makes the following statement concerning this disease:

"The complaints concerning this disease have been more numerous than usual. Specimens have been received from Kansas, Nebraska, and Idaho. This disease has long been very destructive to the wild plums in Nebraska and Kansas."

BEAN

OUTBREAK OF BEAN ANTHRACNOSE IN MISSISSIPPI ATTRIBUTED TO NORTHERN GROWN SEED

D. C. Neal reports, under date of June 26, that bean anthracnose is widespread in Mississippi this season, particularly in the soutern trucking sections where it has resulted in serious losses. In several instances many five and ten acre fields were damaged as much as 75% and the complete loss of five acres in Harrison County is reported. Growers paid about $12 per bushel for their seed and then after planting, fertilizing, and working with the crop, lost all or a large part of it. It is understood that the bulk of the seed planted came from Michigan and New York.

Neal suggests that work be started on bean seed certification, and states that unless Mississippi can be guaranteed better seed they will be obliged to put on a home grown seed program.

In Louisiana, where considerable second crop home grown seed is used, Edgerton reports that the disease is prevalent in about the same amount as last year but of minor importance. A few fields were a total loss, but in most fields there was but little of the disease.

BACTERIAL BLIGHT OF BEANS AS REPORTED FROM SOME OF THE SOUTHERN STATES

Virginia, South Carolina, Kentucky, and Louisiana report bacterial blight (*Bacterium phaseoli*). In the three last-named states, the disease seems to be fully as abundant as usual.

PEA

ROOT ROT OF PEAS AS REPORTED FROM MARYLAND AND WISCONSIN

According to Temple and Jehle the wilt resistant peas that were selected at the Maryland Experiment Station some years ago are showing up well on the Eastern Shore where they have been planted on badly infested soil along with non-resistant varieties. The susceptible peas have suffered very badly, in some places being a complete loss, while resistant selections beside them gave a good crop.

From Wisconsin, R. E. Vaughan reports considerable damage from root rot

on old pea land, some canneries estimating a loss of 40%. Long rotation is vitally important in combating this disease, according to Vaughan.

OTHER PEA DISEASES REPORTED TO THE SURVEY

Leaf spot (*Ascochyta pisi*) is reported from South Carolina, Wisconsin, and California. The disease is of considerable importance in the commercial pea sections in California, according to Milbrath and Horne.

Powdery mildew (*Erysiphe polygoni*) is reported from Mississippi as causing a rapid defoliation of vines and reducing the yield, and from California, where it was injuring the canning crop to some extent.

Downy mildew (*Peronospora viciae*) is reported by Milbrath from Sacramento County in California.

CABBAGE

CABBAGE YELLOWS ABUNDANT THIS YEAR

The following collaborators' reports would indicate that cabbage yellows is of perhaps greater importance this year than ordinarily:

Maryland: One field of two acres that has not grown cabbage for five years had 25% of dead and dying plants, due to yellows. The plants were grown in the family garden and were probably infected before they were set in the field. Yellows is widely distributed over the state. (Temple, June 28).

Kentucky: Specimens received from Louisville and Owensboro. (Valleau, May 30).

Mississippi: Rather general over the state, especially in the southern trucking counties. Reported from Copiah, Adams, Hinds, Lincoln, and Jones Counties. Earliest report from Utica, May 12. The disease is more prevalent than last season, and the damage is, no doubt, increasing. (Neal, June 26).

Ohio: Numerous reports are coming to us from small growers as well as from commercial truck sections which indicate that the disease is spreading rapidly from year to year. In certain truck sections it will be a matter of a short time until it will be unprofitable to grow anything except resistant strains. (Thomas).

Iowa: Unusually severe. (Melhus, June 26).

Missouri: As usual this disease is very severe in the market gardening districts near St. Louis. Although certain fields have been observed with 40% of the plants killed, it does not seem to be as bad as in previous years. (Hopkins, July 5).

OTHER CABBAGE DISEASES REPORTED

Black leg (Phoma lingam) has wiped out some large commercial plantings in Arkansas and it is prevalent in the commercial cabbage section of Long Island. A report of light infection has been received also from Minnesota.

Black rot (Bacterium campestre) reported by Valleau from the Louisville district of Kentucky as being widespread and destructive. Apparently it is a new disease to many of the growers there and indications are that it came in with seed from one of the important seed companies. The disease is also reported from Mississippi, Louisiana, and Long Island, New York.

Ring spot (Mycosphaerella brassicae) was reported by Milbrath as infecting 90% of one thousand acres of cabbage in San Mateo County.

Downy mildew (Peronospora parasitica) destroyed a bed of young cabbage plants near Georgetown, Kentucky, following a few days of foggy, wet weather, according to Valleau.

DISEASES OF OTHER VEGETABLES

"The rust of spinach due to Puccinia subnitens caused loss of several carloads in the truck districts of Walla Walla. This rust is the aecial stage of a rust which is very abundant on salt grass. This is the second occurrence of this rust in Washington, the first outbreak being reported in 1919 from the Yakima Valley." (Heald, July 7).

Fusarium rot of onions caused a heavy loss in the trucking section of Walla Walla, Washington, according to F. D. Heald.

Sclerotium rolfsii has been very prevalent in Texas this year, according to J. J. Taubenhaus, and has caused more than the usual amount of damage to numerous vegetables, such as beans, lettuce, peas, cucumbers, cantaloupes, tomatoes, and squashes.

TOBACCO

WILDFIRE OF TOBACCO APPEARS IN WISCONSIN. SERIOUS ALSO IN MASSACHUSETTS THIS YEAR

The name wildfire seems to be very appropriate when the rapidity with which the disease spreads from one tobacco district to another is considered. Word has now been received that the disease is breaking out in some of the Wisconsin tobacco fields which have heretofore remained free. Plowing up of infected plantations in order to protect neighboring fields is being recommended and as much survey work as possible is being done.

For Massachusetts, A. V. Osmun sends the following significant report:

> "Wildfire appeared in many of the seed-beds of the Connecticut Valley this spring and in some cases the outbreak was so severe that it was necessary to destroy entire beds. More recently, especially since the rains of the past two weeks, the disease has appeared in the field at several points, apparently having been carried from the

seed-beds on diseased plants.

"Either spraying with Bordeaux mixture or dusting with copper-lime dust in the seed-bed when carried out with sufficient thoroughness and frequency has given excellent control."

ROSES

POWDERY MILDEW OF ROSES PREVALENT THIS SEASON

Considerably more reports of this disease than usual have been received this season and from the character of these reports it appears that the disease is more troublesome than in ordinary years. Collaborators in New York, West Virginia, Illinois, Missouri, Arkansas, and Texas all report an unusual number of complaints concerning this powdery mildew.

The weather conditions in the East have been favorable not only for this particular mildew but also for other powdery mildews, especially those on clover and apple. It is possible that further observations and inquiry on the part of collaborators and others will show that some of the other powdery mildews also are more conspicuous this season. You are asked to keep this point in mind and report your observations to the Survey.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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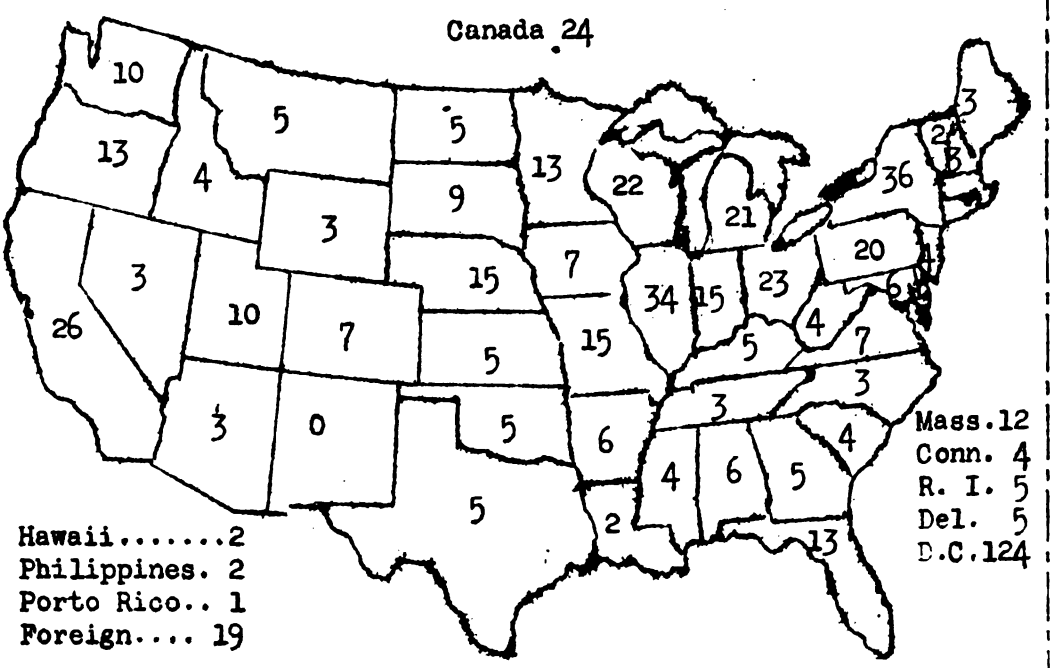

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NOTICE

FIELD MEETING OF PLANT PATHOLOGISTS FOR THE STUDY OF VEGETABLE DISEASES IN THE VICINITY OF PHILADELPHIA, AUGUST 28 - SEPTEMBER 1.

DAMAGE FROM STEM RUST OF WHEAT NOT GREAT THIS YEAR

WINTER WHEAT ONLY SLIGHTLY AFFECTED AND DANGER TO SPRING WHEAT PRACTICALLY OVER

As will be seen from the following reports, infection of wheat and other cereals with stem rust is very slight this year. On wheat the disease is scattered in its distribution, occurring for the most part as local outbreaks. Some of these have caused heavy losses over small areas but in the northern wheat states there has been no general epidemic this year.

The Plant Disease Survey requested the state leaders in Barbery Eradication to report information on stem rust as of July 12, and the accompanying reports, tables, and maps are, for the most part, based on material received from them and from H. D. Barker of Minnesota. This year they have obtained many excellent illustrations showing the importance of the barberry to the occurrence of stem rust. A great many cases showing that the barberry is responsible for stem rust outbreaks could be given, but the following excellent description by K. E. Beeson, of Indiana, will serve as an example. (Cereal Courier 14: 181-182. July 20, 1922).

"A rust epidemic near Alert, Bartholomew County, was one of those investigated by the State Leader. A survey in which the county agent and interested farmers assisted showed an area about four miles long and one and one-half miles wide in which the wheat was so badly infested with black stem rust that part of it had not been harvested. Outside this area the rust decreased and practically disappeared. This is in a rich farming country where the wheat acreage was unusually large, the average from 35 to 100 acres in wheat. Two hundred and fifty acres in this region were completely ruined, and Mr. Elliott, a farmer, placed the loss at $7,000. This does not include 500 acres, the area in which the grain is a partial loss. A local miller upon examination classed grain from one of these fields as "sample", requiring on a $1.00-per-bushel-basis a 29-cent dockage. A 20-bushel yield estimate in this area would mean a loss of $2,900, thus making the total loss in this region this year about $10,000. The estimate was verified by the local banker who assisted in the survey.

"Farmers reported previous rust epidemics over a number of years. Had epidemics of this nature occurred but once in every five years because of rust (epidemics are variable, depending upon climatic and seasonal conditions), the loss during a 60-year period would have been $65,000 with wheat at 50 cents a bushel.

"One large 60-year old bush was located in the southwestern part of this infested region and was responsible for the spread on all sides but more especially to the north and east with the generally prevailing winds in this direction, for it was on that side that the infection was heaviest. The leaves of the bush were still very heavily infected, and farmers traced previous epidemics to this bush after they learned its relationship to the rust. In 1921 it had been responsible for the rusting of wheat in the fields on both sides of it, so that the grain was largely ruined.

"This case against the barberry in this particular locality is similar to those in many localities and illustrates the damage that can be traced to a single bush or to a group of bushes."

Reports on Prevalence of, and Prospects for, Stem Rust

Ohio: During the latter part of May and the first few days of June black stem rust was making its appearance on wheat in several widely separated places in west-central Ohio. Prior to June 5 stem rust on wheat in the Miami Valley was confined to a radius of 500 feet from infected barberries. By June 20 stem rust on wheat near the infected bushes had become heavy. By July 1 the spread of stem rust in wheat throughout the state had practically ended. Stem rust on oats, barley, and rye are of minor importance. Rust susceptible grasses seem to play a minor role in the spread of rust except in the northern part of the state. (John W. Baringer, July 24).

This disease is much less in evidence this year than last and is thought to be less than during average years. Local infections were severe in association with nearby clumps of barberry. (Roy C. Thomas, July 15).

Indiana: Infection on wheat and rye very scattered except where close to infected bushes. Infection on oats very light. Few susceptible grasses in this state. (K. E. Beeson, July 19).

Illinois: Wheat seemed to be infected slightly with stem rust all over the state. Slight infections were found on quack grass, oats, rye, barley, orchard grass, and wild barley near barberries in northern Illinois during May and June. On red top and timothy, it was found in both northern and southern Illinois during this period.

The injury from stem rust on the different grain crops in Illinois this year will not be greater than 1%. (Gordon C. Curran, July 12).

Michigan: No severe attack of black stem rust has been observed either near to or removed from barberry infection. Stem rust has been observed upon several grains and grasses.

No severe attack expected, but overwintering material will be generally distributed. (Walter F. Reddy, July 12).

Stem rust not as yet common in fields although wheat is in hard dough stage. A few cases found, but these were close to barberry and already in teliospore stage. (G. H. Coons, July 12).

Wisconsin: Dry weather in June prevented the spread of the rust and very little damage has been noticed. In most fields there is only a trace of stem rust. (Noel F. Thompson, July 12).

Minnesota: Barberries are universally infected whenever found. The aecial stage has about passed, although it appears from time to time. At present stem rust is rather general in the state although it is worse in some regions than others. If the present weather conditions continue for the next ten days the grain will be comparatively safe, but if we get hot, moist weather there is sufficient inoculum generally all over the state to cause a severe epidemic. However, prospects look bright for an excellent crop where they have had sufficient rainfall. (Leonard W. Melander, July 11).

Winter wheat will mature early in July. The amount of infection varied, in most fields ranging from 5-10%. A few fields were found in

Goodhue County in which as many as 25% of the plants were infected. The rust developed too late to do much damage. (Section of Plant Pathology, July 15).

South Dakota: In every instance where barberries have been found this year there has been infection on them. The infection upon grasses, wheat, and other cereals has been very light. At present it appears that within three weeks a great deal of our small grain crops will be harvested, and it hardly seems possible that under existing cool weather conditions rust can do more than a trace of damage. (Lynn D. Hutton, July 11).

Iowa: Stem rust, in so far as found, shows very slight infection, and most of the wheat was harvested before rust could do any damage. It seems to be generally prevalent in the northern and central portions of the state. We have had a severe drought that has made the grain ripen rapidly and held in check the various plant diseases. (J. H. Muncie, July 10).

Only a trace, less than I have seen any time during the last seven years. (Melhus, July 15).

Nebraska: The prevalence of stem rust of wheat is general but in very small quantities. Most of the winter wheat escaped this year. Stem rust on rye not general. Near heavily infected barberries in Hall County winter rye was very heavily infected about two miles distant from the barberry hedge. There was very little rust on oats except near barberries. Barley was usually rusted throughout the eastern half of the state. The infection was light, however.

Winter wheat has already been harvested and is practically free from stem rust. Spring wheat and other small grains will be damaged only slightly. (A. F. Thiel, July 12).

Kansas: In a few counties very heavy infection occurred. Traces occurred in practically all the chief wheat counties. Warm weather with lack of rain checked what might have been an epidemic. Infection in a light form was present early and would undoubtedly have spread rapidly had climatic conditions not interfered. (Melchers, July 15).

Arkansas: Of no importance this year. (Elliott, July 1).

Wyoming: There has been no stem rust in this state during the present year. However, the counties of Fremont, Sweetwater, Carbon, Uinta, and Lincoln have not been visited yet. The other counties have been visited twice, and I have yet to find any rust. Rusted barberry was found at Cheyenne June 12 and at Sundance June 22. The grains and grasses near the rusted barberry were not rusted when the aecia were found. There will be but little rust this year in this state. (Ralph U. Cotter, July 12).

Colorado: On a twenty-day trip terminating June 30 not an indication of "stem rust" of wheat was found until twelve barberry bushes were located heavily infected. East, south, and west of this, wheat was found infected from a trace to as much as 10%. In the immediate vicinity of the bushes infection was heavier and gradually grew less at farther distance. (C. D. Learn, July 11).

Montana: No rust present in state on wheat except one pustule found at Ekalaka July 1. (Christopher, July 24).

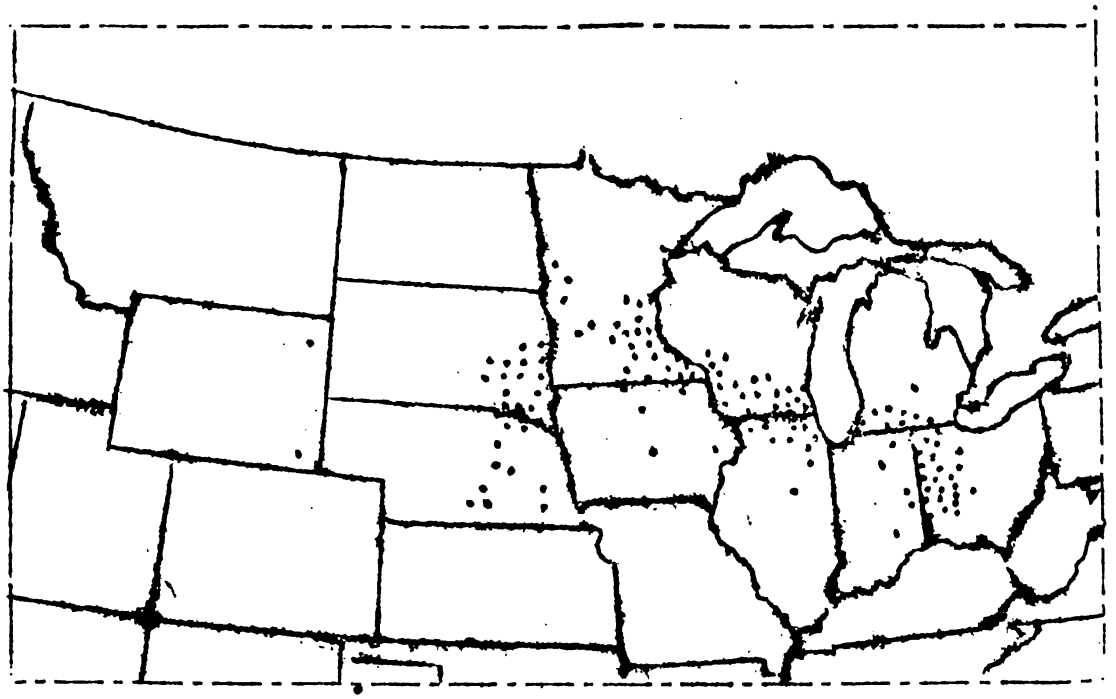

Fig. 5. Counties from which infected barberry has been reported to date of July 12, 1922. Data supplied by barberry eradication state leaders.

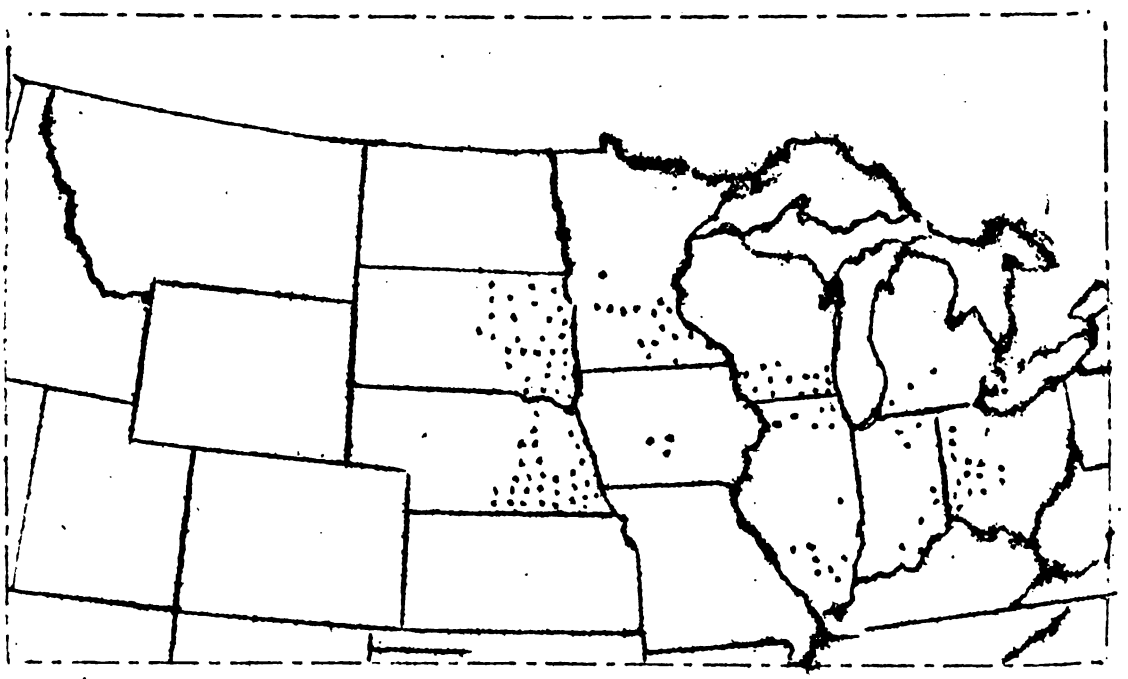

Fig. 6. Occurrence of stem rust on wheat as reported by barberry eradication state leaders, July 12, 1922.

Relation of this Year's Weather Conditions to Stem Rust

The following notes regarding weather relations have been supplied by the state leaders in barberry eradication work:

Indiana: Wet, hot spring and dry June. (K. E. Beeson, July 19).

Illinois: Weather conditions during June were unfavorable for development of stem rust. June was a dry month with very little rainfall. (Gordon C. Curran).

Michigan: Generally speaking, the weather was very dry throughout the period of sporidial infection. In certain localized areas rains were prevalent through the barberry infection period (May), with the result that a heavy crop of aeciospores was produced in Lenawee, Branch, and St. Joseph Counties. (Walter F. Reddy, July 12).

Wisconsin: Dry weather in June. (Noel F. Thompson).

Minnesota: The weather relations to stem rust have varied considerably in various parts of the state. In the southeastern part the conditions for rust were very good where there is sufficient precipitation and some warm weather. However, it is fortunate that there has not been the so-called warm, humid, weather in this section. In the southern, southwestern, and western portions of the state, the precipitation has been very irregular and somewhat spotted. In some communities, there has been no rain at all. Of course these dry areas are not conducive to the production of rust. (Leonard W. Melander, July 11).

Iowa: Dry weather has effectively checked stem rust and infection on barberry. (J. H. Muncie, July 10).

South Dakota: The spring seemed quite favorable to severe rust conditions but after several spring rains the weather in this state changed and until June 26 we had little or no rain and no dews. Consequently, the rust did not mature quickly. Much of it, of course, could not mature at all. The last week and a half it has been quite wet, but unusually cool for this time of the year. This cool weather tends to let the grain fill in fine shape and still prevents severe rust losses. We could say that weather conditions in this state this spring have been ideal for a large small grain crop and less rust losses than usual. (Lynn D. Hutton, July 11).

Nebraska: The weather conditions this year were very unfavorable for the development of rust. The first three weeks of June were very dry. Considerable wheat ripened prematurely. (A. F. Thiel).

Wyoming: The weather this year has not been favorable for the spread of rust. Some of the dry farm wheat has been burned up already, and the conditions over the state are very dry. In the spring it rained so much that the crops were late in being planted, since planting very little rain has fallen. (Ralph U. Cotter, July 19).

Table 3. Dates of first observation of appearance of *Puccinia graminis* in 1922, according to the state leaders in barberry eradication work.

State	Barberry		Grasses		Cereals	
	Date	Place	Date	Place	Date	Place
Ohio	Pycnia Apr. 11 Aecia Apr. 17	Yellow Springs, Green County Montgomery County			May 27	Preble and Montgomery Counties. (Wheat near barberries)
Indiana	June 26	Decatur County (infection black and dry)	July 4	Warren County (*Hordeum jubatum*)	June 1 June 26	Southern part (wheat) Decatur Co. (wheat near barberry)
Illinois	May 6	Gurnee, Lake County	June 10	Gurnee, Lake County	June 11	St. Clair Co. (wheat)
Michigan	May 15	Ingham & Lenawee Cos.	May 15	Lenawee County	June 3	St. Joseph Co. (wheat)
Wisconsin	Apr. 29	Dane County			June 1	Dane County (oats)
Minnesota	Pycnia May 5	Rice County	May 18	Hennepin County (quack grass near barberry)	May 26	Blue Earth Co. (wheat near barberry)
Iowa	June 13 & 23	Several counties				
North Dakota	May 22	Jamestown, Stutzman Co.	June 2	Richland Co. (near barberries)		
South Dakota	May 9	Sanborn Co. 2.5 mi. N.E. of Forestburg	June 21	Northville (close to barberry hedge)	June 21	Northville (wheat close to barberry hedge)
Nebraska	Pycnia Apr. 20 Aecia May 6	Lincoln Gage, Lancaster, Adams, Hall counties	May 22	---- (western wheat grass and wild barley under infected barberries)	May 22	----
Montana			June 26	Rosebud Co. (near barberries)		
Wyoming	June 12	Cheyenne, Laramie Co.				
Colorado	May 8	Denver, Arapahoe Co.			June 15	Morgan County

ADDITIONAL REPORTS ON LEAF RUST OF WHEAT

From Ohio, R. C. Thomas reports that infection was general throughout the state but little loss was occasioned. In Michigan, according to G. H. Coons, the disease was common beginning with the first development of plants. The leaves were badly affected early in the season, and following the milk stage the grain developed entirely on stem and leaf-sheath green. Coons thinks that the loss must be considerable although the grain appeared plump. In South Dakota the rust was abundant, according to Evans, no field being free from it. No damage resulted, however. Vaughan in Wisconsin records it as very heavy this year and particularly noticeable on the club varieties. From Iowa, on July 15, Melhus reports that the rust is less severe than last year on account of its being held in check by hot, dry weather in June. From Kansas, on July 15, Melchers writes that leaf rust is very prevalent in most parts of the state, the foliage being completely dried in many fields but very little spread of rust to leaf-sheaths. C. D. Learn, in Colorado, observed leaf rust as prevalent on winter wheat in the dry land areas. In the irrigated sections on spring wheats very small amounts were found.

REPORT OF THE ANTHRACNOSE OUTBREAK IN OHIO

The members of the Department of Botany of the Ohio Experiment Station have recently investigated the unusual occurrences of anthracnose in that state and regarding the situation R. C. Thomas writes, on July 15, as follows:

> "This disease is causing greater loss to the wheat crop in Ohio this year than it has ever been known to do before. Losses vary from a trace to 90%. Infection has been found to be particularly severe in southern portions of the state. In many sections where the black stem rust was so severe last season (1921) anthracnose is the only disease to be found this year causing any appreciable loss."

A special leaflet entitled "Anthracnose disease causes weak jointed straw, with falling of same and failure of grain to fill" was issued from the Ohio Experiment Station, July 11. In this leaflet, the symptoms of the disease are described; the hosts - rye, oats, timothy, chess, orchard grass, and blue grass, are mentioned; and the control measures, seed selection, and disinfection, and crop rotation are briefly discussed.

SCAB REPORT FROM OHIO

Ohio: The Fusarium form of scab attack on heads of wheat was general over Ohio during the season. Counts of percentages were not made in large numbers, but estimated infections range as high as 20% with 3 to 5% loss in yield. In one instance in Champaign County the Gibberella form of the fungus attacked the lower nodes and sheaths, causing pronounced failure to fill. This was in association with attacks of leaf rust. (Selby, July 15).

In Wisconsin Dickson reports scattered late infection of winter wheat. From Iowa, Melhus reports 2% scab on July 15, and from Illinois the disease was reported on the same date as causing slight damage. From South Dakota Evans reports no scab on winter wheat, July 15.

BUNT OF WHEAT AS REPORTED BY COLLABORATORS IN SOME OF THE EASTERN STATES

Moderate amounts of bunt caused, for the most part, by *Tilletia laevis* are reported in winter wheat from eastern and central states as follows:

Virginia: Very slight, no severe cases reported. (Fromme, July 1).

Tennessee: Covered smut of wheat is about 1%. (Sherbakoff, June 3).

Arkansas: About 4% damage. (Elliott, July 1).

Ohio: Bunt is quite general though rarely in sufficient quantity to cause severe losses. One case from Wood County showed 10-15% loss. The cases reported were numerous in southwestern Ohio. Apparently losses are not commonly considered as appreciable. Wheat seed treatment is infrequent. (W. J. Young, July 15).

Illinois: Distributed generally throughout the wheat areas of the state, but present only in small amounts. Our reports indicate very slight infections this season and no appreciable loss. (Tehon, July 15).

Michigan: Smut of wheat (*Tilletia laevis*) present but less than normal. Heavily smutted grain of susceptible varieties giving 50% or more of smut in crop (winter wheat). Fairly clean grain practically smut free. Dust control extremely promising and as efficient as dry formaldehyde. (Coons, July 12).

Iowa: Very spotted, varied from 0 to 12%. This smut is not common except in isolated fields. (Melhus, July 15).

Kansas: Not as prevalent as 1920 and 1921. Only a trace in some fields, others had as high as 20%. The wheat crop as a whole was free. (Melchers, July 15).

LOOSE SMUT OF WHEAT

The following reports are like those from other states recorded in earlier numbers of the Bulletin, in that they show the disease as common in about the usual amounts, and that it is a factor of importance.

Ohio: Loose smut is rather more frequent than in average seasons. One field in Wood County showed 10% of loose smut. The amount reported is greater in southwestern counties reaching 4-6% and occurring more frequently than the stinking smut. Seed treatment is not extensively practiced for loose smut but appears desirable. (Young, July 15).

Illinois: Occurrence, throughout the state. Infection and loss corelative, and averaging about 5%. Infection varies from as low as one head in 10,000 to 30 in a hundred. Seed treatment is practiced only rarely. (Tehon, July 15).

Michigan: Loose smut of wheat present but high percentage of 1921 not being repeated. On account of reduction by rather severe winter. (Coon, July 12).

Wisconsin: Few fields showing 3-4%, trace often present. (Dickson, July 15).

A DISEASE CAUSING FAILURE OF WHEAT HEADS TO FILL REPORTED FROM MONTANA

CAUSE UNKNOWN

Montana: Have seen and heard of considerable damage in winter wheat due to a failure of part or all of the head to fill. In some cases the stalk is broken over at points 6 or 8 inches below head. Often dark colored lesions are found on the leaf sheaths and culm, and on base of glumes. These lesions as well as spots on leaves suggest bacterial cause. Not infrequently all the leaves are found to be blighted, while many leaves on neighboring plants are quite healthy and green.

Roots and crown appear to be normal for most part, and as yet we have not discovered evidence of presence of parasitic organism on these organs. (Jennison, July 15).

OAT SMUT REPORTS

The oat smuts are being reported in about the usual amounts from a considerable number of states. The following quotations showing resistance and susceptibility of varieties are of especial interest:

Wisconsin: Wisconsin Pedigree # 5 shows high degree of smut freedom whem compared with other varieties and selections at the Spooner Branch Station. Seventeen varieties in test plots, none treated. (Vaughan, July 11).

Minnesota: First reported June 16 from Anoka and Rice Counties. Varieties Minnesota 108 and Sixty Day showed heaviest infection at Anoka on this date. Infection now fairly general wherever oats are grown. Some fields show as high as 10% infection, while others show only a trace. (Department of Plant Pathology, June 29).

In Louisiana Edgerton reports very light infection of locally raised seed, and in Kansas Melchers reports that seed treatment is becoming quite general.

CROWN RUST OF OATS

Leaf rust of oats (*Puccinia coronata*) is reported from New York, Delaware, South Carolina, Georgia, and Nebraska. From Louisiana, Arkansas, and Kansas collaborators write as follows:

Louisiana: Oat rust was very severe even on the local resistant varieties. Non-resistant varieties were killed without heading. The

actual loss in the state was not as great as a year ago because there was not as much seed shipped in for planting purposes. (Edgerton, July 15).

Arkansas: Common but less severe than usual. Oats did especially well this year. (Elliott, July 15).

Kansas: Heavy late infection, but too late to cause very much injury. (Melchers, July 15).

ERGOT OF RYE

Small to moderate amounts of ergot (Claviceps purpurea) are being reported. The following statements indicate that the disease is not destructive but is rather widespread in the rye states.

Ohio: Farm of W. C. Garber, Belleville, Richland County. Moderate amount of infection on volunteer rye in clover field. (Young, July 15).

Illinois: Occurring in practically all fields, but the infection is slight with very little loss as a consequence. On volunteer rye our field men are finding an abundance of material. (Tehon, July 15).

Michigan: None seen so far, even on common, volunteer plants. Extremely dry at blossoming time. (Coons, July 1).

Wisconsin: Extensively reported from all sections of the state. Real damage small. (Vaughan, July 15).

Minnesota: About the usual amount of ergot was found on rye this year. Infections seem to be very light in the west central part of the state; particularly heavy infections were found on volunteer rye in various places. In some cases, 15-20% of the kernels in a head were infected. (Section of Plant Pathology, July 15).

South Dakota: Trace, generally a small amount in each field. Of no serious consequence. (Evans, July 15).

ANTHRACNOSE OF RYE

As usual, anthracnose of rye was destructive in Ohio. It will be seen from the following reports that it caused some damage in neighboring states.

Tennessee: Two fields in southern portion of the state heavily infected. (Hesler, June 23).

Ohio: Nearly every planting investigated was infected. It is evident that the disease is state-wide and worse upon rye than any other cereal. In all cases where rye has been grown successively for two or three years there is a complete failure this season. Early reports state that Rosen rye suffered very heavy loss. (Thomas, July 15).

Michigan: I have to report two cases of rye being seriously injured by anthracnose and on the specimens sent to the office abundant production of the fungus such as you supplied us in previous years. In one case it was reported that soil conditions were very unfavorable for normal vigorous growth (Sturgis, Michigan). I merely have the specimens in the second case (Adrian, Lenawee County). The rye was bleached, half filled and died when half grown. (Coons, July 12).

Wisconsin: Reported from a few fields. (Vaughan, July 15).

Minnesota: First reported June 23, in Meeker County. Infection apparently light. Very little damage noted. (Section of Plant Pathology, June 29).

BACTERIAL WILT OF SWEET CORN (BACTERIUM STEWARTII) BAD IN PARTS OF MARYLAND AND VIRGINIA

Under date of July 18, A. G. Johnson reports as follows: "On July 17 Messrs. Woodbury, Metzger, and I inspected about 125 acres of sweet corn at Westminster, Maryland. This disease was found cutting down the yield of Golden Bantam from 50-60%. Of this variety 600 acres were planted, and the total area in sweet corn in this and other varieties was over 1200 acres. The other varieties were much less severely attacked."

F. D. Fromme of Virginia writes on July 18 as follows: "Bacterial wilt has been unusually severe being found in every patch of Golden Bantam seen. One patch showed a 25% infection, another 50% and a third 90%."

MORE ABOUT POWDERY MILDEW OF RED CLOVER

The accompanying maps show the states from which powdery mildew was reported in 1921 and thus far in 1922. The first collaborator's report of powdery mildew on clover in the Plant Disease Survey files is from Sheldon in West Virginia, 1908. Since that year Professor Sheldon has almost annually reported the conidial stage of this mildew as occurring in small amounts in the vicinity of Morgantown, West Virginia. For 1915 reports from Idaho, Washington, and Oregon are available, and since that year Heald and Dana in Washington, and Miss Willis in Idaho, have frequently reported *Erysiphe polygoni* on red clover. Reports from Utah for 1916 and 1917 are also available.

According to Miss V. K. Charles, the Office of Pathological Collections has specimens showing the perfect stage of the mildew on clover from the following western states. None of the collections from the East, however, show perithecia.

E. polygoni DC. on Trifolium involucratum Willd., near Andrews, Oregon.
E. polygoni DC. on Trifolium variegatum Nutt., Lo Lo, Montana.
E. polygoni DC. on Trifolium pratense L., Delta, Colorado.
E. polygoni DC. on Trifolium pratense L., Caldwell, Idaho.
E. polygoni DC. on Trifolium latifolium, Warrens, Idaho.
E. communis on Vicia Americana, Helena, Montana.

E. communis on Trifolium pratense, North Yakima, Washington.
E. communis on Trifolium involucratum, Wet Mountain Valley.

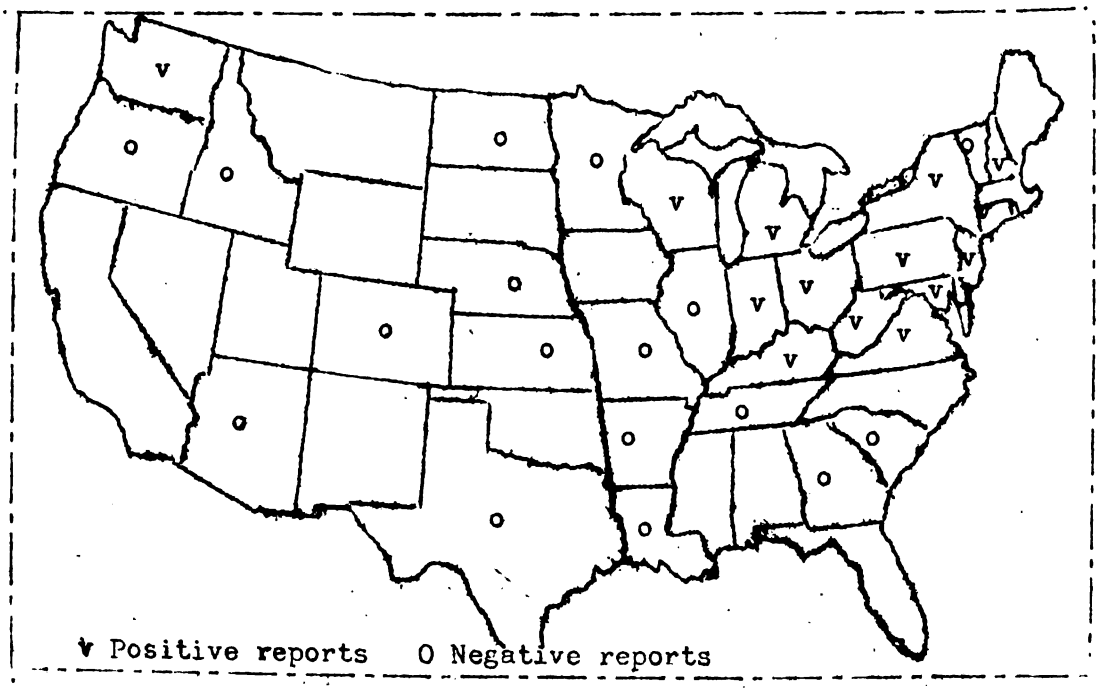

Fig. 7. Geographic distribution of powdery mildew of red clover in 1921, according to Survey reports.

From the State of Washington, B. F. Dana writes July 18, 1922 that the disease is common in its perfect state there. It would appear then that the perithecial stage occurs commonly in the Northwest, but is absent or rare in the East.

In the Survey files reports of the occurrence of powdery mildew on alsike clover are also available from West Virginia in 1908, 1912, and 1915, and from Minnesota in 1919. On white clover, Idaho reports powdery mildew in 1915, 1916, and 1917, with notes that it occurred in moist situations, particularly in fields where over-irrigation was allowed. Sheldon in West Virginia also reported it on white clover in 1912. During the present epidemic in the East neither of these two clovers are reported as affected.

Some of the other reports concerning the occurrence of the disease this year, received since the statement was issued in the July 1 number of the Plant Disease Bulletin are as follows:

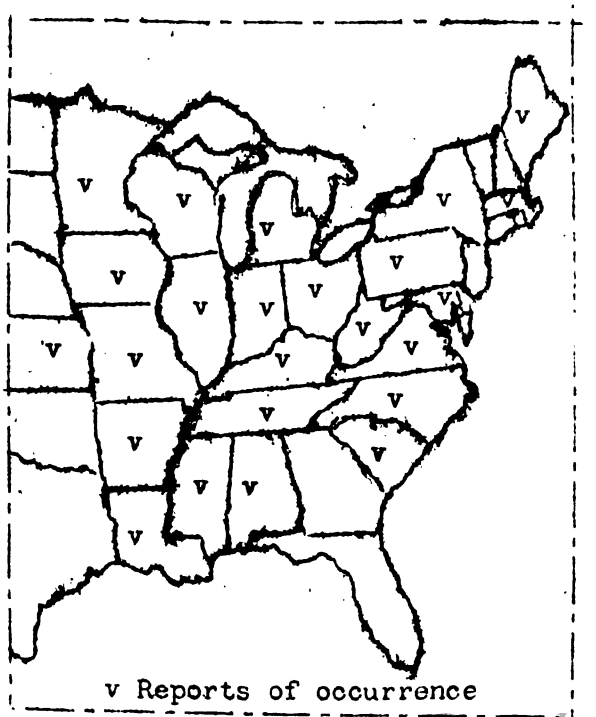

Fig. 8 Geographic distribution of red clover powdery mildew, August 1, 1922, according to Survey reports.

Massachusetts: Powdery mildew has been generally noted on red clover throughout the state, but no serious damage has been observed. The red clover crop is unusually heavy and not a single complaint of damage from powdery mildew has come to this office. The general appearance of the disease has been attributed to wet weather. (Osmun, July 15).

Pennsylvania: Powdery mildew of clover has again appeared in epidemic form throughout this vicinity. We made a careful survey last year throughout the season for the cleistothecia but were unable to find them. They must be formed very late in the season at the time the plants are dying. (Orton, June 22).

Ohio: Of general distribution throughout the state but extensive outbreaks have been reported only from the southern counties. (Young, July 1).

Michigan: Common everywhere. Reported from practically all parts of state. No authentic reports of stock poisoning. Mail very heavy with inquiries. Was equally common late in the season in 1921. Veterinary Department report that no case of poisoning came to their attention last year or none this year so far. Advice given this year is to cut early, cure carefully and feed cautiously. (Bessey, July 12).

Minnesota: At the present time the powdery mildew is epidemic in the entire section of the state just south of the east-central part. It seems to extend in epidemic form as far west as Renville County, while fields in the extreme western part of the state are free from the disease. In the infected portions 75-95% of the leaves of the first crop were infected. The second crop almost 100% infection. Plants in new fields are very heavily infected also. (Section of Plant Pathology, July 15).

Iowa: Very common, and destructive to hay crop. Red clover and Mammoth most susceptible. Crimson quite resistant. (Melhus, July 15).

ROOT ROT OF CLOVER REPORTED FROM OHIO

"Clover root rot, caused by *Sclerotinia trifoliorum* and *Fusarium* sp., has been less serious than usual as the favorable growing weather has permitted infected fields to outgrow the trouble. At the same time there has been a relative increase in the Sclerotinia as compared with the Fusarium. The former is important mainly in the northwestern and the latter in the southwestern section of the state." (Young, July 1).

OTHER CLOVER DISEASES

Anthracnose, caused by *Colletotrichum trifolii*. "Serious in a few fields in western Ohio." (Young, July 1).

Leaf spots, caused by Macrosporium sarcinaeforme and Pseudopeziza trifolii, were reported by Young of Ohio on July 1 as follows: "Both of these leaf spots are unusually prevalent in northern and western Ohio and will doubtless lower materially the yield and quality of the hay. In some fields it is difficult to find mature leaves which are free from spots and all the lower leaves are dead."

Leaf spot, caused by Sphaerulina trifolii, was reported from Missouri by Hopkins on July 5 as follows: "This disease appears to be very common in white and alsike clover in Missouri, but it is probably not very serious. The earliest infection observed in Columbia was found March 18, 1922."

Polythrincium trifolii in Illinois. "It is a matter of interest to me to find that in the western part of Illinois, particularly in Madison, St. Clair, Jersey, Menard, Tazewell, and Calhoun Counties, the white clover used largely for pasture purposes is covered to a large extent with the mold Polythrincium trifolii. Practically all pastures where this clover is grown are infested. The infection of plants varies from 30-70% and from 60-70% of the leaves on these plants are affected with reduction of photosynthetic surface of from 2-30%. While there is no apparent financial loss involved by the presence of this mold, it strikes me as being of interest as a correlation with our present widespread attack of powdery mildew on the red clover." (Tehon, June 27).

ALFALFA DISEASES

Leaf spot caused by Pseudopeziza medicaginis is reported from Vermont, Delaware, Missouri, and Kansas. In Missouri Hopkins says, "This disease has been quite severe this season and large numbers of reports and inquiries about it have been received. It is quite generally distributed everywhere alfalfa is grown."

Leaf spot caused by Pleosphaerulina briosiana, was reported from Missouri (About five specimens of this disease have been received, but it does not appear to be doing any damage. Hopkins.) and from Kansas (Quite common, but no marked inquiry. Melchers.).

Leaf spot caused by Ascochyta medicaginis. "This disease has been severe in certain instances and a number of reports and inquiries about it have been received. Besides the spotting of the leaves, specimens have frequently shown badly affected stems." (Hopkins, July 5).

Downy mildew (Peronospora sp.) was reported from Missouri and Kansas.

White top, probably non-parasitic, was reported from Montana. "Very prevalent in first crop in some sections. Cause of much uneasiness. Seems to be combination of environmental conditions prevalent during spring and early summer, which unquestionably aggravated this trouble." (Jennison, July 15).

LATE BLIGHT OF POTATO THREATENING

The month of June was excessively wet in parts of New England and the North Atlantic states, including West Virginia, and also in the northern portion of the Great Lake states. In these same areas considerable rain has also fallen during July. Apparently, then, there has been sufficient moisture to insure initial infections of Phytophthora in our more northern and important late potato areas. Owing to the fact that there was very little blight last year the sources of infection must be comparatively few and this

may tend to retard the development of the disease, however, with continued wet and cool weather during August and September much damage may result, especially late in the season. The disease is already occurring in some of these areas as is shown by the following reports:

Connecticut: Found late blight of potato first on July 7 and on July 20 it was getting a good start. So if wet weather continues it will be serious this year, as July 7 is the earliest, or nearly the earliest, that we have ever found it in this state. (Clinton, July 18).

New York: (Riverhead, Long Island) Late blight is becoming more and more serious; spraying or dusting is general. (E. E. Clayton, July 24).

(Gainesville, Wyoming County) Observed June 30 on volunteer potatoes which are now entirely destroyed. Not observed in cultivated fields to date. (C. R. Stevenson, July 24).

West Virginia: Observed in Tucker County, July 2. The disease was already well established. (Anthony Berg, July 12).

Michigan: Extremely heavy rains have just occurred over the state. The Upper Peninsula and the northern part of the Lower Peninsula have had an abundance of well distributed rainfall in contrast to lower half which has been dry, though somewhat cool. Late blight will probably occur in the northern part this year. Greater interest in spraying than ever before due to activity of county agents with spraying rings. Spray machine manufacturers report greatest year with field machines ever. (Coons, July 12).

Wisconsin: Potato late blight reported from Colby, Wisconsin, by Mr. Carl Hazelburg, field man from Bowker Insecticide Company.

Weather through northern Wisconsin has been cool and wet, ideal for blight. The report from Colby is the earliest I recall. It was a garden plot with very heavy vines. (Vaughan, July 23).

Virginia: (Norfolk Section) No late blight was reported in the trucking section. (T. C. Johnson, July 24).

REPORTS OF BLACKLEG OF POTATO

The following reports indicate that blackleg is a disease of considerable importance in some places this year:

Pennsylvania: More blackleg in Pennsylvania than ever before. Apparently on seed imported from Michigan and Maine. Unusually severe on Cobblers. Prevalence 1-5%. (Thurston, June 27).

Georgia: Reported from one field causing a total loss. Attributed to poor seed from out of state. (McHatton, July 1).

Nebraska: Blackleg reported. Considerable scattered infection in early potato sections given from imported seed. Being held in check by dry weather. (Goss, June 26).

Kansas: Damage of 2-8% in untreated fields, slightly less in treated. Entire plant goes down. (Richard P. White, July 15).

INFORMATION ON POTATO MOSAIC AND LEAF ROLL ESPECIALLY DESIRED

Readers are asked to make as many field observations as possible on these two important diseases this year and to report the same to the Survey for correlating and summarizing. These diseases present one of the most important problems of the potato industry and the seed producing and certification movements, and the bringing together of many miscellaneous observations from different parts of the country may materially assist in hastening the solution of the problem.

From Maryland, C. E. Temple reports that in one field of Jersey Red potatoes 87% leaf roll was observed. From Louisiana, Edgerton writes that excellent success has been obtained with the use of certified seed this season. Some lots showed a high percentage of mosaic but as a rule the certified seed was good. However, about 25% of the potato crop was probably lost in Louisiana this year on account of mosaic, according to Edgerton.

RHIZOCTONIA STEM ROT BAD IN NEBRASKA AND KANSAS

Nebraska: Heavy infection early in season causing considerable killing of sprouts. One field 100 acres, 75% infected when plants were 3 inches high (Goss, June 26).

Kansas: Very prevalent and serious on fields planted with untreated seed stock. Causing a loss this year of from 10-60 bushels an acre. (White, July 15).

HOPPERBURN OR TIPBURN ?

Reports from various parts of the country showing the relative importance of leaf hoppers and physiological factors as causes of burning of potato leaves are greatly needed. More information should be collected concerning the geographic distribution of the two troubles. In some parts of the country, particularly in New England, it would seem that leaf hoppers are not factors of much importance. But in many of the other late potato states they seem to be of primary importance. In 1921 these troubles probably caused greater financial loss to potato growers than any other disease.

Reports are at hand from New Jersey and Kansas indicating considerable hopperburn, while from Minnesota the Section of Plant Pathology reports that "During the hot period, June 1 to 3, there was a great deal of physiological tipburn., The following rain and cool weather effectively checked this trouble."

WATCH FOR YELLOW DWARF OF POTATO

The symptoms of this disease, which is becoming common in New York, are well recorded in the recent article by Barrus and Chupp (Phytopath. 12: 123-132. March 1922). Although these writers state that they have not proved that the disease is communicated with the seed the circumstancial evidence

points very much that way, and since New York produces a large quantity of seed potatoes it is very possible that this disease will be showing up in other states, particularly where New York seed is planted. M. D. Leonard, of the Bowker Insecticide Company, has just reported a case in a four-acre field of Green Mountains at Pompton, New Jersey.

TOMATO MOSAIC ANNUALLY BECOMING OF INCREASED IMPORTANCE

From an examination of past Survey records it would appear that mosaic is rapidly assuming major importance. The following reports concerning the disease have been received to date:

New York: (Long Island) One field observed with 50% of the plants badly diseased. (Clayton, July 24).

New Jersey: On the 24th of June considerable mosaic was found on an acre field of tomatoes at Pompton and from time to time since, plants have been found in two or three other fields of about the same size showing this disease. (Leonard, July 18).

Louisiana: Very severe and widespread. With the control of the wilt by the use of wilt resistant varieties, the mosaic is becoming our most serious tomato trouble. Reductions in yield of over 50% have not been uncommon during the present season. (Edgerton, July 15).

Ohio: Mosaic infection is very serious in certain greenhouse sections. Infection evidently occurred when the plants were very small. We are at a loss to understand how such widespread infection has occurred. (Thomas, July 1).

The recent bulletin on tomato mosaic by Gardner and Kendrick, of the Indiana Experiment Station, (Indiana Agr. Exp. Sta. Bul. 261: 1-24. May 1922) brings to mind again the importance of closely observing wild plants and weeds for symptoms of mosaic and also for other diseases that may be communicated to more valuable crops. The discovery of these wild perennial hosts of tomato mosaic, Physalis sp. and Solanum carolinense, will undoubtedly go a long way in the solution of this increasingly important problem. Collaborators and others will undoubtedly have the opportunity to make valuable observations along these lines during the course of the summer.

FUSARIUM WILT OF TOMATO

THE RESISTANT VARIETIES DEVELOPED BY THE U. S. DEPARTMENT OF AGRICULTURE

The Department of Agriculture has now developed five varieties of tomatoes which, although not immune to wilt, possess enough resistance to insure a good crop if other conditions are favorable. The Marvel, which is a medium early tomato, was selected from Merveille des Marchés and bears a heavy crop of smooth, red fruit. The Norton was selected from Stone and is a late tomato excellent for canning, home gardening, or late trucking. Its yield is heavy and the fruit is smooth, solid, red, ripens slowly, and ships well. The Columbia and Arlington are medium varieties selected from Greater

Baltimore. The Norduke has recently been developed and is similar to Stone and Norton. It shows the highest resistance of any tomato to wilt, and also some resistance to Septoria leaf spot.

As regards the prevalence of Fusarium wilt this year and results with resistant varieties, the following reports are interesting.

South Caolina: Two records. A good many people are growing wilt resistant tomatoes. (Ludwig, July 15).

Georgia: Common in gardens, very serious. (McHatton, July 15).

Mississippi: The disease is present again this season in about the usual amount. Widely prevalent in many parts of the state. The wilt tolerant strains, viz; Norduke, Norton, and Normal developed by Pritchard of the Bureau of Plant Industry are proving to be very satisfactory varieties for the home gardener, and there is already a good demand for seed of these varieties. (Neal, July 15).

Louisiana: Severe as usual in many parts of the state. The Louisiana wilt resistant strains have given excellent results during the present season. (Edgerton, July 15).

Ohio: Wherever commercial seeds of tomatoes are grown in infected soil, the Fusarium wilt disease is occurring this year. It is too early at the present time to estimate losses. First indications point to the fact that they will be very considerable. (Thomas).

BLOSSOM END ROT OF TOMATO

Blossom end rot is common and the cause of considerable loss in South Carolina, Georgia, and Mississippi, according to collaborators. In the latter state, D. C. Neal says that the extremely hot, dry weather that prevailed during the first two weeks of June induced the disease. With the return of more favorable weather conditions the end rot became less conspicuous.

OTHER TOMATO DISEASES

Bacterial wilt (*Bacterium solanacearum*). Scattered occurrences of this disease are reported, particularly from home gardens, in South Carolina, Georgia, and Louisiana.

Early blight (*Alternaria solani*).

Mississippi: Not serious this season only in a few localities. One grower reports severe early blight injury in a three-acre field in Holmes County. (Neal, July 15).

Louisiana: In spite of the wet season and apparently favorable conditions, there was less early blight than usual. (Edgerton, July 15).

Root rot (*Heterodera radicicola*) was reported as follows from Louisiana: "Very troublesom in some parts of the state, especially the northwest portion. In some sections it is difficult to grow tomatoes on account of the nematodes." (Edgerton, July 15).

BEAN ANTHRACNOSE

Generally speaking, weather which is favorable for late blight of potato is favorable for bean anthracnose. Rainy weather during June and July in the northeastern states would tend to promote infection. The following collaborators' reports have been received:

Vermont: Noted on stems and leaves of garden beans. Not yet in bloom. Wet, cold weather seems to have produced easy infection. (Lutman, June 12).

Massachusetts: Generally present throughout the state, but no serious cases have been noted. (Osmun, July 15).

New Jersey: Anthracnose is common in several small plantings of string beans at Pompton. (M. D. Leonard, July 18).

Delaware: First observed July 7, very common and destructive because of frequent rains. (Adams, July 15).

Georgia: Common and serious on some crops causing large losses in certain fields. (McHatton, July 15).

Arkansas: Some on yellow wax beans, not severe. (Elliott, July 1).

Wisconsin: Observed in Madison. Not reported from other sections. Probably not serious. (Vaughan, July 15).

Minnesota: Only one report of anthracnose has been found this season. This was a half acre plot, found in Ramsey County, July 7. About 3% of the plants were infected, the injury ranging from light to heavy. Individual heavily attacked plants were found from which the disease seemed to be spreading in the field. (Section of Plant Pathology, July 15).

MORE REPORTS OF BEAN BLIGHT

The following additional notes concerning blight caused by *Bacterium phaseoli* have been received:

Massachusetts: Occasional, but not serious. (Osmun, July 15).

Delaware: Leaf infection very prevalent June 19. (Adams, July 15).

Michigan: Looking fine, but bean blight starting actively. (Coons, July 12).

Minnesota: The only reports which have come in so far have been from Ramsey County. In a few fields as high as 95-100% of the plants were infected. So far the disease has been found only on the vines. Many of the gardens in this region which have been inspected are entirely free from the disease. (Section of Plant Pathology, July 15).

CABBAGE YELLOWS DESTRUCTIVE

The following reports, in addition to those given in the July 15 number of this Bulletin, indicate that cabbage yellows, caused by *Fusarium conglutinans*, is the cause of severe damage this year.

Virginia: Yellows is again causing severe loss in the southwest section. Specimens were also received from Orange County. (Fromme, July 19).

Arkansas: General and severe. (Elliott, July 1).

Michigan: Cabbage club root and yellows found by Nelson to be very serious about trucking section near Grand Rapids. (Coons, July 15).

Kansas: Very severe, especially in fields that have been in cabbage two years or more. Loss runs from slight to about total in some cases. (White, July 15).

Montana: This disease has ruined some small crops. Not commonly seen heretofore. (Jennison, July 15).

NEW YORK REPORTS WILDFIRE OF TOBACCO

ADDITIONAL INFORMATION FROM OTHER STATES

The first report of the presence of this disease in New York State was sent in by H. E. Thomas, July 14. It reads as follows:

"On July 13 I spent part of the day in Chemung County looking at tobacco fields. The county agent and some of the growers are very much concerned about an outbreak of wildfire in some of their fields. I only visited three farms but found wildfire in abundance in two of the three. In the first of these, several counts showed from 93-100% of the plants infected. On the second farm the seed bed was heavily infected and two fields planted with the grower's own plants showed in every count above 95% of the plants infected. A planting in which he used plants from a neighbor's seed bed had not developed wildfire so far as could be seen from the margin of the field, although the plants were growing only a few yards from the seed bed and from the infested field. The tobacco is of the Connecticut-Havana type."

From Virginia F. D. Fromme writes, under date of July 19, that no wild fire was observed in plant bed inspections this year and none has been found in the field to date. This report is in distinct contrast to those that have been received from the more northern tobacco states, where considerable damage has been done.

Other reports on the disease are as follows:

Massachusetts: The situation does not look as serious as it did earlier because of the luxuriant growth of new leaves which have developed in the dry period since the wet spell prior to the middle of the month. The new leaves have largely covered over the infected ones near the ground and I think the tobacco growers are inclined to forget that the disease is present to any extent in their

fields. I hope weather conditions will dontinue unfavorable to the spread of wildfire for otherwise a lot of growers are going to be greatly disappointed in the condition of their crop by harvest time. (Osmun, July 24).

Connecticut: Wildfire is appearing much more generally distributed in our tobacco fields this year and it looks very much as though in some instances the trouble was brought on by a primary field infection. We have had long continued rains and these have spread the trouble rather rapidly. With dry weather, however, we noticed a check in spread. (G. H. Chapman, July 17).

Georgia: Reported from Tifton. Not serious. (McHatton, July 1).

OTHER TOBACCO DISEASES REPORTED

Blackfire (angular-spot) was reported by Fromme from Virginia under date of July 19 as follows: "Blackfire is beginning to appear in the fields but in only moderate amounts to date. Many fields which have reached the topping stage are free from infection, and in others the injury is restricted to a few bottom leaves. This agrees with plant-bed conditions observed earlier. The plant-beds as a rule were quite free from infection in sharp contrast to the condition that has existed for several years past. No wildfire was observed in our plant-bed inspections and none has been seen in the field to date."

Mosaic is prevalent in the section around Lynchburg, Virginia. All fields seen were infested, the amounts ranging from less than 1% to 50% of the plants. (Fromme, July 19).

Root rot caused by *Thielavia basicola*.

Connecticut: Owing to the rains and comparatively low soil temperatures, Thielavia injury is being noted to a greater extent than last season, and is particularly noticeable on the earlier set tobacco. The later set crops appear to be doing rather well. (Chapman, July 17).

Kentucky: Root rot is showing up in newly set tobacco in several parts of the state. The resistant standup strains are already showing decidedly better growth than the common varieties. (Valleau, June 23).

ANGULAR LEAF SPOT OF COTTON

Arkansas: More severe than ordinarily, especially the black-arm phase. (Elliott, July 1).

Arizona: Fields planted with untreated seed show occasional plants having black-arm lesions. In one field 133 infected plants were counted on a half-acre. Considerable damage may follow the beginning of the summer rains. Fields planted with seed treated with sulphuric acid show little or no black-arm. (Brown, June 20).

REPORT OF THE DISEASE OF COTTON CAUSED BY ASCOCHYTA

The new cotton disease, recently described from Arkansas by Elliott, (Arkansas Agr. Exp. Sta. Bul. 178: 1-18. April 1922) is reported this year by Elliott as follows: "June 23 - This disease has done some damage in Logan County but has now been checked by dry weather."

CHERRY LEAF SPOT BAD IN MICHIGANS' IMPORTANT CHERRY SECTION

At Traverse City, Michigan, Montmorency cherries were being received at local canning factories at the rate of 40,000 pounds per day during the first part of July. When losses such as are reported below occur, it can well be seen that leaf spot is a factor of importance.

> "Worst in years. Crop loss in Grand Traverse and surrounding counties so far as saleable fruit of size is concerned, total in some orchards. Spraying careless or neglected. College spraying experiments have given perfect control in that region (Farrand). Trade papers estimate loss in yield in cherry district at 10%. Local papers estimate loss at 25%. Higher figure seems probable from appearance of majority of orchards seen from road on recent trip through northern section. In Berrien County loss slight. In Van Buren County loss extremely heavy. Dust has given good control with Morello in Grand Traverse County (Farrand)." (Coons, July 12).

FIRE BLIGHT IN THE EAST

On pears, fire blight has not been reported to the Survey as much more prevalent than usual, but on apples in the belt of states from Virginia west to Kansas it has apparently been especially destructive this season in the form of blossom and twig blight. In Wisconsin, Minnesota, North Dakota, and Iowa, where it has been abundant in recent years, it appears not to be more destructive than usual.

It would seem likely that at the time the apple trees were in blossom this year, conditions were also favorable for oozing of bacteria from hold-over cankers on pear trees and for insect dissemination of the organism. The relation of the infected pear tree to blossom blight of apple has been strikingly shown in the Arkansas survey work mentioned below.

> Massachusetts: The most serious outbreak of fire blight on apples noted in years occurs in several sections of the state. In several instances practically all the new growth of shoots has been killed. In no instance have we noted a serious case of fire blight in orchards which have been thoroughly sprayed, but we are not prepared to attach any significance to this observation. The most serious cases have been observed in Hampshire and Middlesex Counties. (Osmun, July 15).

> Pennsylvania: Pear blight does not seem to have been generally serious this year. In local cases it has been troublesome on pears and quinces, but I have not seen any bad cases on apples resulting from blossom blight. Perhaps this may be due to the killing of

so many blossoms in spring, and to the adverse weather at blooming time, which lessened the transmission by insects. (McCubbin, July 27).

Delaware: First observed May 16 on Transparent and Jonathan and later found on Rhode Island Greening and York Imperial. More prevalent than last three years. More prevalent on pears than apples this season. (Adams, July 15).

Virginia: Fire blight is considerably more severe than in the average year but the injury to the apple crop for the state as a whole will not be great. It is of slight importance in the Valley which produces the bulk of the crop. The Piedmont and Southwest sections were hardest hit, blossom blight being especially common on York and Pippin. As a rule, the larger commercial orchards will escape with slight injury. It is the home or small commercial orchard with a few pear trees nearby that is severely affected. (Fromme, July 19).

Arkansas: In our apple belt in northwest Arkansas I believe we had about the worst blight year I have ever seen. Perhaps it was a little worse in about 1912, though I cannot feel sure of this. The accounts which we received regarding the damages done by this disease have led us to believe that in some instances it caused a loss of 90% of the bloom. Since the blight struck that part of the state we have had numerous complaints from fruit growers in that section, asking the Board to undertake the eradication of pear blight in that section by requiring the destruction of the pear trees. (Geo. C. Becker, July 12).

In general the severity of blight infection within any particular section having the same soil and other conditions varied rather closely with the distance of the pear trees from the apples and it varied to about the same extent with the number of pear trees from which the infection spread. In most all cases where there was a large number of pears the blight was not only worse on the individual trees but was spread farther and more generally throughout the orchard. And though the difference is not so marked, the blight has a noticeable tendency to follow the wind, the prevailing winds coming from the southwest. Within some sections and even on the same farm there were orchards and trees having the same proximity to pears that showed a great difference in the amount of blight present. This was no doubt due in part to the vigor of the tree, as evidenced by tender growth, which was brought about by difference in the fertilizing or care of the orchard. In those cases where infected trees were scattered through the orchard the infection could be attributed to nothing other than the susceptibility of the individual trees.

With only one exception, all of the orchardists with whom I talked consider the close proximity of pear trees to be responsible for the presence of blight in their apple orchards, and all who had pears were willing to have them destroyed. With the exception of those at Bentonville, I did not learn of any pear orchards that were considered of commercial importance. (Geo. W. Winfrey, June 10).

Illinois: Worse than usual but somewhat local. Especially serious as a twig blight and fruit blight. Many apples half grown were rotted. Some sections of the state seemed to have escaped entirely. (Anderson, July 1).

Michigan: Prevalent in certain Duchess orchards in peculiar blossom blight form, causing death of practically all blossom bearing twigs on certain limbs. Strong start as twig blight in May which was checked by dry weather following in June and early July. (Coons, July 1).

Wisconsin: This is quite bad on apples in Wisconsin this year. Those who were here last year tell me, however, that it was worse last year than it is this. (L. R. Jones, July 20).

Minnesota: There is slightly more fire blight this year than last, although it is not nearly so severe as in 1920. In the immediate vicinity of University Farm there are very few infections, although reports indicate that it is fairly heavy in the west central part of the state. The disease seems to be developing late this year and is just appearing in the orchard on the University Farm, at the present time. (Section of Plant Pathology).

Iowa: Apple blotch is much less common than previous years. Occurs only in isolated cases on crabs. (Melhus, July 15).

North Dakota: Although North Dakota is not an apple state, several varieties which are grown here have been attacked by fire blight each year. Fire blight locally is more severe than last year, but hardly more severe than in 1920. Holdover cankers have developed many new infections, twig as well as blossom blight being noticeable about June 1. The spring was cold and rainy, much succulent growth being formed. Several instances have been found where the entire tree was blighted. (Weniger, July 24).

Missouri: There never has been as much fire blight on apples and especially upon the Jonathan and certain varieties of the early apples as there is this year in Missouri as far as the records seem to show. From my own observation I do not believe that fire blight for the state as a whole is more noticeable on the pears this year than for the average year, but on apples it is extremely noticeable and destructive. (H. A. Cardinell, July 14).

REPORTS OF FIRE BLIGHT FROM THE NORTHWESTERN FRUIT SECTIONS

The following information, received from men who are in close touch with the fruit industry of the Northwest, is of much interest:

Montana: Hot dry weather early June to about July 4 appears to have checked the spread of blight in large measure. Trees of the more susceptible varieties quite severely damaged at early date. Crop loss heavy in principal fruit sections due to extraordinary prevalence of twig, spur, and blossom blight. (Jennison, July 1)

Washington: I have been on a trip into several of the apple growing districts of the state and find that pear blight is unusually prevalent in most of them. Here at Wenatchee it is more prevalent than it has been since 1915 but the State inspectors are dealing with the situation very vigorously and I think they have it well in hand. The same is true of the Okanogan Valley. I was particularly interested to note however, that in the Kettle Falls district they are not doing anything about it. We saw oozing and running cankers that they were paying no attention to whatever, also evidences of some blossom blight but the amount of twig blight was not great. (D. F. Fisher, July 21).

Concerning fire blight in this district (Wenatchee) I will say that it has amounted to almost nothing for a number of years past, but is showing up this year in quite a virulent form in two or three very limited portions of this district, such as Stemilt Hill and Stemilt Creek and at Pateros, but I think it is being held in control to prevent serious damage. (P. S. Darlington, July 11).

Oregon: As reported by C. C. Cate, County Pathologist of Jackson County, Medford, under date of July 1, "Fire blight is general. Bad on Spitz (Oesopus) in some localities. Better than last year generally over the county. Seems to be checking up at the present time."

As reported by H. B. Howell, County Agent, Josephine County, July 1, "Fire blight is beginning to run in localized areas, especially on Spitzenburg, and some twig blight on Newtown."

No fire blight has been seen in the Willamette Valley so far this year and in Hood River Valley it is not present in the main orchard districts. Not reported as troublesome in Eastern Oregon. Unknown in the Coast sections. The conditions are evidently not as bad as sometimes and the total damage for the state will not be large in all probability even in the worst sections. (Barss, July 1).

Hood River Valley has never been the center of many serious blight, though occasionally infections have been found for a number of years. These have been cut out properly and as a result the orchards of the Valley can be considered free from this disease. This season, however, blight has been quite prevalent along the eastern edge of the county in scattered orchards which have been more or less neglected in the past. The disease has not appeared to any extent in the plantings of the Valley. This condition has been anticipared as blight has been approaching from eastern Oregon for several years and it is hoped that by vigorous fighting on this border that blight may be kept from the main orchard districts. It is interesting to note that practically all of the infections are found on apples and only rarely has a pear been infected. Last season I had occasion to observe in a blighted district east of the Hood River District, apples very seriously affected along side of Bartlett pears which did not show a single infection. This season we are again finding that it is only rarely that pears show blight infection, though some have been found. As usual the Spitzenborg is the variety suffering most from this disease. I have just recently returned from a trip to Southern Oregon, visiting a number of the fruit districts

to Southern Oregon, visiting a number of the fruit districts throughout that part of the state. Blight is much more prevalent this season than it has been for a number of years, and is quite widely distributed. On the pear varieties of this section, I observed that Bosc and Bartlett show a greater amount of injury than was true of the Anjou and Comice. Blight was noted on apples in southern Oregon adjacent to pear plantings, but in this section the pears appeared to show more blight than was true of apples.

County Fruit Inspector Mills, of the Klickatat County, Washington, which is directly across the Columbia from Hood River County, reports blight quite serious in the east end of the county, but that he had found but few infections in the main plantings of the White Salmon District. He also reports that he has not found a single pear tree infected with the disease, while adjoining Sptizenbergs were damaged so seriously as to require cutting down. He reports Spitzenbergs most noticeably affected, followed by King of Tompkins,and rarely present on adjoining Newtowns and Ortleys. The disease has been found on wild hawthorne, Crataegus sp., and to some extent on service berry, Amelanchier sp., Mr. Mills believes that in one section of this county it would be necessary to remove the native host plants before the diseae can be effectively controlled. (Leroy Childs, July 13).

We have had a rather serious late outbreak of pear blight in this Valley (Bear Creek), similar to the one experienced in the Sacramento Valley in California. I do not, of course, know the cause of the outbreak in California, but possibly they are identical with those in southern Oregon.

First, we had a light blossom infestation, and this was much later than usual. We felt very fortunate until the fruit had reached considerable size, but at that time a serious infestation of the young fruit appeared and this destroyed considerable fruit, and in many cases ran into the branches, necessitating rather heavy cutting. This was not confined to any one variety, but was quite common in practically all of our varieties. It is difficult to account for the late infestation, but it was undoubtedly due to insects. It is quite possible that certain insects, including ants and some of the common thrips, may have been more active than usual. I believe that this is the case. In our own orchards we now have the disease under perfect control, and this is true of most of the commercial orchards in the Valley. In some cases I understand they are still having considerable trouble. (F. G. Reimer, July 17).

Blight is not so bad in the Valley (Rogue River) this year as it has been in the former years. Due to our practice here for the past four or five years of very strict inspection service and to the cooperation of the pear growers, we are holding blight down to minimum amount of infection. Occasionally there are a few orchards that are not thoroughly cleaned up during the dormant period and blight then does considerable damage. Most of our pear growers now practice root and crown inspection as well as trunk and branch inspection, which I think is the biggest factor in controlling blight. (C. C. Cate, July 21).

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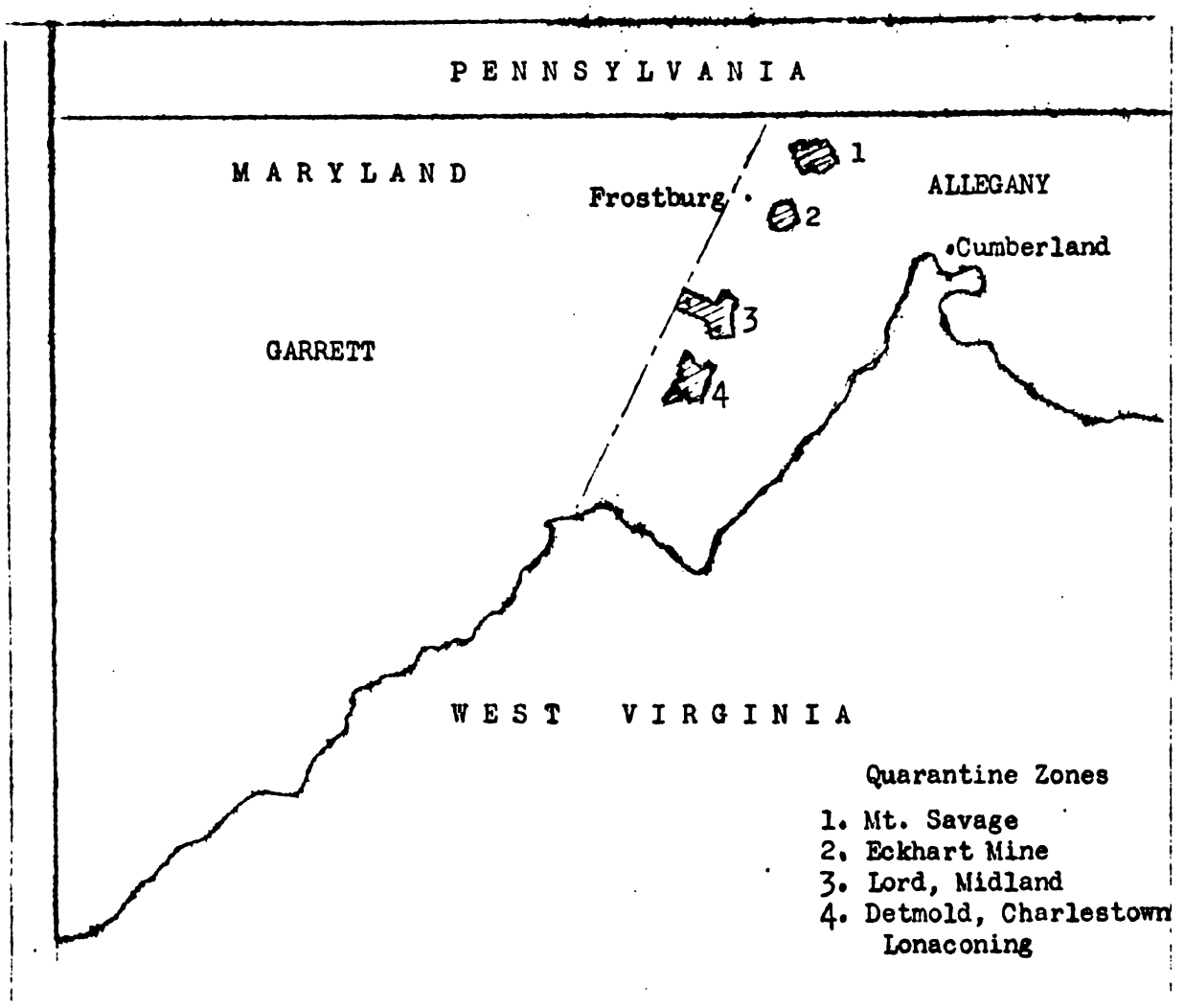

Fig. 9. Potato wart quarantine areas of western Maryland. (For summary, see page 81.)

THE BARBERRY AND CEREAL STEM RUST SITUATION IN EUROPE

The relation of barberry to stem rust of cereals in southern Europe is summarized by E. C. Stakman in a letter of July 14, 1922 from Vienna to the Office of Cereal Investigations as follows:

"In France, Spain, Italy, Greece, Jugo-Slavia, Hungary, and Austria, Berberis vulgaris is said to be indigenous, and apparently it is. At least it is very common and thrives luxuriantly in the mountains; and European botanists think it is indigenous. However, it is rare in agricultural districts, except in mountains. This is due to the fact that it has been very generally eradicated from most of the regions in which grain is grown extensively - in France as a result of local regulations, in Hungary and Austria by order of the Ministry of Agriculture and by royal decree, respectively. In Spain, France, Italy, Greece, and Serbia there were beautiful demonstrations of the effect of the bushes on rust. I had to take Fragoso's word for it in Spain, but in the other countries I saw the finest imaginable demonstrations. In addition to B. vulgaris, B. vulgaris aetnensis, and B. cretica are wild and apparently indigenous - the former in the Mediterranean countries, particularly Spain and Italy, and the latter in Greece. Within 50 Dm. of Athens, B. cretica was very heavily rusted, and Hordeum bulbosum, as well as other grasses, were very heavily rusted but only near the bushes. It always has been a source of wonder to me to know just what the situation in Italy and Greece might be, especially on account of the observations of Pline and the earlier records of Theophrastus regarding rust. If they had the black rust in mind, it is no wonder they saw it. B. vulgaris is very common in the Alps and Appennines of Italy, and B. cretica is very common in the very region in which Theophrastus lived in Greece."

WHEAT BUNT IN THE NORTHWEST

The following reports from the Northwest indicate that bunt is troublesome in that area this year:

Montana: More stinking smut this year in fields where seed grain was not treated. (Jennison, August 1).

Colorado: Referring to the trip beginning at Fort Morgan, no indication of bunt was found until south of Wray. Thence from that point to Fort Collins bunt was present here and there. Some fields showed only a trace while one particular field was a 50% loss. Other fields there showed 5-10% and 20% loss. It was noted on this trip that bunt was more prevalent in late sown grain than early. (Learn, July 15).

Idaho: Stinking smut is much worse in northern Idaho than last, many fields having from 20-45% smut. (Hungerford, August 1).

Washington: More than average amount of smut in the Palouse country. Field counts have been made running as high as 25% smut in fall wheat. (Dana, August 1).

SCLEROTIUM RHIZODES REPORTED AFFECTING WHEAT IN IDAHO

This fungus has been found occurring on wheat in Idaho for the first time. It is associated with severe local damage to wheat. Regarding this C. W. Hungerford reports as follows:

> "Over 500 acres of winter wheat badly affected. Less than one-half a stand in most fields. Dead plants in rosette stage of development found on the ground in July. Entire plant covered with small sclerotia."

INFORMATION DESIRED ON BACTERIAL STALK ROT OF CORN

SUSPECTED CASES SHOULD BE DETERMINED

What appears to be the same bacterial stalk rot of corn as described by Rosen of Arkansas (Arkansas Agricultural Experiment Station Bulletin 162: 1-7, 1919) has been reported this year from Arizona and Ohio. In the former state J. G. Brown states that two affected plants were received from Maricopa County; and in Ohio, Selby and Thomas report that the disease seems to be more generally distributed this year than heretofore.

An effort should be made this year to determine the distribution of this disease more accurately and to gather data regarding its importance. Professor Rosen is anxious to get material from as many places as possible. Specimens of the disease may be sent to him at the Experiment Station at Fayetteville, or to Charles S. Reddy, who is working on bacterial diseases of corn and is in a position to make isolations and furnish reports of his determinations. He may be addressed at 209 Eddy Building, Bloomington, Illinois.

HALO-BLIGHT OF OATS

A few miscellaneous reports of this disease which was described by Miss Elliott (Elliott, Charlotte. Halo-blight of oats. Jour. Agr. Res. 19: 139-172. pl. C, 26-35. May 1920), have been received. More information should be gathered concerning this disease and the other less common diseases of oats and other cereals. Reports of halo-blight for 1922 are at hand only from South Dakota, Colorado, and California. In the last named state W. W. Mackie reports infection as light but general over the Coast areas and in the interior, especially in the Sacramento Valley. He states that it is carried on wild oats (*Avena fatua*).

MORE REPORTS OF FIRE BLIGHT OF APPLE AND PEAR

The following additional reports throw further light on the fire blight situation:

> Canada: I have been fairly well over the Province (Ontario) the past six weeks and find that the blight is particularly bad this year, especially on pears. There are many instances too where large apple orchards show the blossom blight to a very marked extent. On the whole, I think the disease is worse this year than it has

been for a number of years here in Ontario. Our files show that we have very much more correspondence on this disease than we have had for four or five years. (J. E. Howitt, August 9).

Vermont: Very common everywhere as twig blight. It is scattering and is being overlooked by many growers, but it is present in almost all orchards and in all trees. We are sending out warning press notices as it is much more general than last year. (Lutman, July 15).

New Jersey: Very severe this year on pears and apples. There is probably more damage done this year than ever observed before in New Jersey. Many orchards show 100% infection of pears in all sections of the state. While not nearly as severe on apple, much infection has been observed. (Poole, July 15).

South Carolina: Noted several times but data insufficient for deciding whether or not it is more prevalent than usual. (Ludwig, July 15).

Georgia: General, but not as serious as in previous years. (McHatton).

Louisiana: Twig blight stage quite severe on some varieties. (Edgerton).

Michigan: Fire blight is quite prevalent in Michigan this year. I found a very serious attack in the orchard of Mr. George Winegar at Morrice, and find it more or less general in the orchards of the western fruit belt. I am unable to say regarding pears, as I have not visited many pear orchards. (Church, July 24).

South Dakota: We have noted an abundance in the state this year. I have had occasion to travel over most of the state and have been asked concerning it in many places. It is doing a lot of damage. (Evans, July 27).

Montana: We have considerable blight infection all over the state this year. It has been on the increase for the past two years but this year is assuming serious proportions. It was originally a blossom infection and on some of our varieties has stopped at that point. We find that most seriously infected varieties, of this present infection, run about as follows: Alexander, Transcendent crab, Jonathan, Wealthy, Rome Beauty, Northern Spy, Gano, and McIntosh. The Jonathan is very seriously infected this year and it is still actively running down into the larger limbs on these varieties. The McIntosh is about the only one that is running true to form as far as blight resistance is concerned.

The blossom infection has been so serious that it has been an impossibility to start in cutting it out, in fact, we have not recommended it, but our plan is to put on a program to, if possible, eradicate the Alexander, Transcendent, and Jonathan. The Jonathan, in this state, is of no value regardless of the blight and we would be better off without it. (W. L. Shovell, July 27).

Arizona: Fire blight of pears and apples is very common in Arizona, especially in apple orchards in small valleys. I do not think that fire blight is worse than usual this year. It has been

reported to affect Bartlett pears worse than other varieties. Very little effort is made to combat the disease in this state. So far as favorable conditions are concerned it is possible that frequent late frosts after very warm weather may have something to do with the prevalence of the disease in this state. (Brown, July 24).

APPLE SCAB EPIDEMIC IN THE EAST AND NORTHEAST

OF ONLY SLIGHT IMPORTANCE IN THE NORTHWESTERN FRUIT SECTION

The accompanying reports give an idea of the seriousness of scab in the Northeast this year. They also indicate that dry weather in the Northwest has kept the disease down:

New Hampshire: Very prevalent throughout the state. Susceptible varieties such as the McIntosh badly diseased and resistant varieties such as the Baldwin also unusually scabby. The worst year I have ever seen since being in the state. (Butler, July 1).

Vermont: Very common. Much worse than last year. Very rainy June aggravated it, especially on susceptible varieties. In some cases thorough spraying in June did not stop it. On July 7 I visited a 150-acre orchard at Castleton where the McIntosh Reds had been practically defoliated in some cases. The severe infection was due, apparently, to sappy tender growth produced by 3 pounds of ammonium sulphate to each tree and a very wet June. As this orchard was a mixed one the following list of varieties with disease resistance is of interest: McIntosh Red, foliage covered with scab and about one-third dead or dropped. No fruit. Northwestern Greening, leaves and fruit affected badly. Delicious, fruit badly scabbed, a little on foliage. Northern Spy, Wolf River, and Alexander, fruit affected only. Duchess of Oldenburg, free from scab on fruit and leaves. (Lutman, July 15).

Massachusetts: The apple scab situation continues serious throughout the state. Not only are the usually susceptible varieties such as McIntosh, Fameuse, and crabs badly affected, but other varieties ordinarily considered more or less resistant in this state are in many localities seriously affected with the disease. The wet weather has continued up to the present time and many late infections have been noted as a result. Despite the wet weather, however, orchards thoroughly sprayed according to the standard schedule for this state have continued relatively free from scab. (Osmun, July 15).

Pennsylvania: Very severe throughout state. Many growers did not spray last season on account of the freeze, and some failed again this season for the same reason. Losses as high as 90% of the crop reported. Average losses will be unusually high. (Thurston, July 31).

Virginia: Scab is causing severe losses throughout the state in spite of much better spraying than in previous years. Some of the

spraying has been poorly done and frequently important applications have been omitted. In the best sprayed orchards scab has been held satisfactorily and in our experimental work it has been reduced to a negligible amount in the plots receiving the full schedule of applications. Unsprayed trees show 90-100% affected fruit. Ascospore discharge has occurred over a longer period than recorded heretofore. (Fromme, July 19).

Illinois: Scab on both foliage and fruit is more prevalent and destructive than I have ever seen it before. Many orchardists failed to get their sprays on in time and losses are heavy. Even in well (commercially) sprayed orchards the scab is serious. The spray schedule of our station gave good control. (Anderson, July 1).

Michigan: Most severe since 1915. Excessive wetness in early spring, coupled with early spore discharge - before pink has entrenched fungus and lead to terrific epidemic. Disease most severe in eastern and northern parts of state. Control there in orchards not given pre-pink spray very poor. Pre-pink or delayed dormant demonstrated this year as very essential for control. Loss in grade of apples in many orchards will be extremely heavy, many orchardists planning to use apples for cider already. (Coons, July 1).

Minnesota: There is about the usual amount of scab in such orchards that have been visited this year. It is very common in unsprayed orchards but not very common in well kept orchards. (Section of Plant Pathology, July 15).

Idaho: Apple scab is not severe in the state this year. This is doubtless due to the very dry spring. Very slight infection where noted. (Hungerford, July 1).

Oregon: Coast section - general. Willamette and Hood River Valleys - very much less than usual; less, in fact, than for years. Sprayed orchards are practically clean. In Lane County the fruit inspector reports only about 30% scab infection on unsprayed orchards. Southern Oregon - very light this year. Rest of state - no scab report. Very little if any rain in fruit sections since blossoming. (Barss, July 1).

Washington: Less prevalent and severe than usual. (Dana, July 1).

APPLE BLOTCH REPORTS

Since the issue of the July 15 number of this Bulletin, the following reports on apple blotch (*Phyllosticta solitaria*) have been received:

Maryland: Apple blotch is very prevalent in Eastern Shore orchards which were not sprayed with Bordeaux mixture. The northwestern Greenings seem to be most severely infected. (Jehle, July 24).

Virginia: Blotch (Phyllosticta) was first reported on June 16. It is found in occasional orchards and is of slight importance except locally. (Fromme, July 19).

Louisiana: Severe as usual on the few apples that are in the state. (Edgerton, July 1).

Arkansas: Not as bad as expected from abundance of twig cankers. Bad in ill kept orchards in central and eastern Arkansas. (Elliott, July 1).

Illinois: Blotch is somewhat more prevalent than usual. It is especially severe in the central part of the state where a few years ago it was unknown. The spray schedule of the Station has given perfect control. (Anderson, July 1).

THE CEDAR RUST SITUATION IN VIRGINIA

Cedar rust is abundant this year in the eastern apple sections where cedars are growing in proximity to apple trees. Reports of the situation in some of the states have been given in other numbers of this Bulletin. The following are interesting reports from Virginia where the disease is annually of more economic importance than in any other state.

"Cedar rust is epiphytotic wherever cedars and apples occur in proximity. Frederick County is the only Valley county which will not suffer severe losses. Systematic cedar eradication has been in progress there for several years. An estimate of the average leaf injury in Frederick County is 5% as compared with an average of 50% for the other Valley counties. Fruit infection is unusually prevalent and is found to some extent on all varieties. The foliage of York Imperial and other susceptible varieties in close proximity to cedars appears yellow at a distance and close at hand are seen to be literally plastered with infections. Leaves are beginning to fall and the fruit is showing the dwarfing which follows."(Fromme, July 19).

"The cedar rust situation in certain counties where the cedars have not been cut, is very serious this year. It is the limiting factor in certain counties south of here. Going along in the train or in a car many of the York orchards appear to be burned and discolored. In many cases there is premature defoliation."(F. J. Scheniderhan, July 24).

SPECIAL SURVEY WORK ON EUROPEAN CANKER IN OREGON THIS YEAR

A survey is being made in Oregon to determine the geographic distribution of the European canker caused by Nectria galligena and to gather information relative to the susceptibility of apple varieties. According to H. P. Barss, the disease appears to be present throughout western Oregon but is causing no appreciable damage on most commercial apples. No reports of its occurrence in eastern Oregon have been received. So far the following varieties have been found susceptible by S. M. Zeller: Red Cheek Pippin (bad),

Bismark, Delicious, Pennock, Bellflower, Oesopus, Northern Spy, Greening, and Newtown (slight).

REPORTS OF APPLE ANTHRACNOSE (NEOFABRAEA MALICORTICIS) FROM OREGON AND WASHINGTON

Oregon: General west of the Cascades including Hood River County. Severe everywhere where control measures are not employed. Damage to trees in some places estimated at 35% by Lane County inspector. Spraying with Bordeaux once before the fall rains gives perfect control and as the result of control campaigns the situation is no longer menacing. (Barss, July 1).

Washington: Less frequently reported than usual, probably due to unfavorable climatic conditions. (Dana, July 1).

RASPBERRY DISEASES REPORTED FROM MICHIGAN

Michigan: Raspberry diseases were looked over by a party of pathologists including Drs. Shear and Wilcox of the United States Department of Agriculture. Leaf curl and mosaic found on reds; mosaic and blue stem found in varying proportions on black caps. Crown gall common in many plantations. Blue stem in many plantings very limited in distribution, but with a few plantations, from 25-50% found. Close nursery inspection in nursery center (Berrien County) is being undertaken by State Department of Agriculture. Plants will be inspected and permitted to be sold from only first class patches. (Coons, July 12).

RASPBERRY LEAF CURL AND MOSAIC

According to Rankin, et al, (Phytopath. 12: 253-264. June, 1922). raspberry yellows is separable into two diseases - leaf curl and mosaic. Collaborators and correspondents should make an effort to distinguish between these two troubles and report them separately. More definite information concerning the distribution, damage, susceptibility or varieties, etc. is needed. Under the name of yellows, or mosaic, these diseases have been reported this year from New York, Ohio, and Minnesota, but the information available is very meager. These diseases are of much importance in some states at least and more work should be done on them.

MORE REPORTS OF STRAWBERRY ROOT ROT

Complaints of root rots of strawberry have become more frequent during recent years. In addition to reports from New York and Kentucky in the July 1 number of this Bulletin, the following have been received:

Maine: I have had two reports of the plants suddenly dying in the field without any apparent cause. I had a single plant from

one of these fields to examine. I could find no evidence of a parasitic disease above ground. The leaves and crown simply indicated sudden death. The roots appeared dead and brittle, but I could discover no evidence of the cause of this condition. (Morse, July 1).

Illinois: Very serious in many patches. This disease frequently causes entire patches to die out. No organism except Rhizoctonia found. No insects present. (Anderson, July 1).

Idaho: A root and crown rot of unknown cause has been reported from several sections, both this year and last. Serious in Bingham County. Symptoms of the disease appear to be a general stunting and yellowing of the foliage. Death of the outer leaves and in extreme cases the entire plant succumbs. (Hungerford, July 1).

Washington: (Rhizoctonia solani) Especially severe on account of dry summer. (Dana, July 1).

STRAWBERRY YELLOWS

The following report from Minnesota is of interest. If collaborators or others have made observations of similar strawberry diseases, it is desired that they report them to the Plant Disease Survey for summarizing and recording.

Minnesota: A very serious yellowing has appeared on strawberries this year. It is much more severe on some varieties than on others. It is apparently of the mosaic type, although its infectious nature has not been demonstrated. The disease is under investigation. (Department of Plant Pathology, June 29).

STRAWBERRY NEMATODE AS REPORTED FROM OREGON

Oregon: Nematode, (Tylenchus dipsaci) was found on wild strawberry along the ocean shore by McKay and Barss in Lincoln County at Newport (first record for this county). Reported as being present in its usual abundance in wild plants in the Coast Section of Lane County. Damage to cultivated plants in that section about 50% according to C. E. Stewart, fruit inspector. Doubtless present on wild and cultivated berries on the coast of Coos and Douglas Counties where it was found last year. Not known to be present on strawberries anywhere in the state outside of Coast strip except at Corvallis where it is under investigation at the Station. (Barss, July 1).

COMPLAINTS OF BLACK ROT OF GRAPES FROM EASTERN STATES

On account of the wet weather in the East, the complaints of black rot caused by Guignardia bidwellii have been unusually numerous. Clinton

in Connecticut reports the disease as widespread and severe, and in the grape district of southwestern Michigan, V. H. Church, Agricultural Statistician for the Bureau of Crop Estimates reported, July 24, that the rot is prevalent, developing rapidly, and doing extensive damage. Reports of damage in West Virginia have been received and considerable quantity has been observed in the District of Columbia.

REPORTS OF BACTERIAL GUMMOSIS OF CHERRY IN THE NORTHWEST

According to B. F. Dana, two reports of this disease have been made to the Experiment Station at Pullman, Washington; and H. P. Barss of Oregon writes as follows:

> "Reported from all over western Oregon. Apparently as bad or worse than last year. Some orchards in Lane County reported free from trouble; others damaged up to 15-20%. Cate reports that many large limbs are being affected in Ashland district where the disease appears worse than last year in many places. None reported from east of Cascades." (Barss, July 1).

LATE BLIGHT OF POTATO IN NEW ENGLAND, NEW YORK, AND NEW JERSEY

Late blight seems to have a strong foothold in New England and New York, and in the important potato sections in New Jersey, according to the following reports:

Vermont: Late blight has occurred in several localities in the state. The infection so far is light but general over most of the fields attacked and may easily become serious if frequent rains and cloudy weather prevail. In view of this fact, spraying should be more frequent and thorough. Late blight was first seen in Rutland County, July 17. (A. H. Gilbert, August 2).

Massachusetts: First appearance noted July 25 on experimental plots in Amherst. The disease was present in a few limited areas and had gained very little headway. Weather conditions since that date have been favorable to the development of late blight. There have been no other reports. (Osmun, August 1).

Connecticut: Early start and coming on slowly; no complaints but expect serious rot of late potatoes if weather continues wet. (Clinton, August 11).

New York: Late blight is rather general on potatoes throughout the state. I have observed it in the following counties: Cattaraugus, Allegany, Monroe, Broome, Cortland, Nassau, and Suffolk. It has also been reported from several other counties as Oneida, Oswego, Livingston, and Ulster. In no case, have I observed it as being serious but many fields have a few affected leaves on nearly every plant. If weather conditions are favorable for the fungus later we will have a severe epidemic, no doubt. (Chupp, August 12).

New Jersey: Throughout central part of state, but not destructive. (Cook, August 1).

EARLY BLIGHT OF POTATOES (ALTERNARIA SOLANI)

Vermont: Reported to me during the latter part of July from near St. Johnsburg. Is now occurring locally to some extent. Not serious. (Lutman, August 1).

Massachusetts: There has been very little early blight in the fields this year. (Osmun, August 1).

Connecticut: More than usual thus early and at least two or three Irish Cobbler fields seen have suffered considerably. (Clinton, August 1).

New Jersey: Less than usual for this season of the year. (Cook, August 1).

Delaware: Very prevalent throughout state. Heavy rains associated with its severe prevalence on early crop. (Adams, August 1).

South Carolina: Fairly general but probably not very severe. Damage moderate in the Charleston trucking area according to Tisdale. (Ludwig, August 1).

Georgia: Well distributed in state, causing considerable loss. (McHatton, July 1).

Mississippi: Present again as usual in many localities throughout the state. Damage slight. (Neal, August 1).

Illinois: Occurring throughout the state, and causing serious losses in some instances. Our most common and most destructive potato disease. (Tehon, August 1).

Minnesota: Light infections have been found in St. Louis County. (Department of Plant Pathology, August 1).

Kansas: Not serious this year, slight damage. (White, July 15).

BLACKLEG OF POTATOES

Numerous reports of blackleg, caused by Bacillus phytophthorus, have been received. These reports indicate the special severity of the disease in Minnesota and the Dakotas this year.

Massachusetts: Observed in a few fields. One grower reports heavy loss. (Osmun, August 1).

Connecticut: Occasional plants in most fields; not serious but at least the usual amount. (Clinton, August 1).

Virginia: Reported from Eastern Shore section and also from Washington County (southwest). General prevalence and severity unknown. (Fromme, August 1).

South Carolina: Present and quite severe in a crop in wet soil near Georgetown. Certified potatoes produced a much better stand with much smaller number of dying plants and rotting tubers at digging time. (Ludwig, August 1).

Minnesota: Very heavy in the Red River Valley. Infection running as high as 15% in many fields. Very little in the northeastern section of the state, averaging 2-3%. Light infections have been reported from Pipestone, Hennepin, Wadena, and Dakota Counties. (Department of Plant Pathology, August 1).

North Dakota: This year diseases, blackleg especially, are taking a heavy toll of the crop. A loss of 10% is very common, and I am finding fields that run as high as 35% of vines killed. Yesterday I was in a field with about 75% infection of blackleg and Rhizoctonia. This, of course, is unusual. (F. C. Hathaway, August 5).

South Dakota: Blackleg is abundant in eastern South Dakota this year. (Evans, August 10).

Montana: Usual amounts seen in some fields. (Jennison, August 1).

Washington: Showing up in crop of current season in small amount comparatively. (Dana, August 1).

POTATO LEAF ROLL AND MOSAIC

The following reports on leaf roll and mosaic of potatoes have been received. Readers are urged to contribute information on these two important diseases.

Mosaic

Connecticut: Not very prominent; apparently not more than usual if as much. (Clinton, August 1).

New York: Up to 85% of stand being affected. (Clayton, July 24).

New Jersey: More than usual. (Cook, August 1).

South Carolina: Fairly general but damage apparently slight. (Ludwig, August 1).

Mississippi: Mosaic is still the dominant Irish potato disease in the Gulf states. Bliss Triumph stock continues to develop a high percentage of the disease. The damage from this disease is difficult to estimate, but it is considerable. Widespread again all over the state. (Neal, August 1).

Arkansas: About 15 to 20% of Bliss infected. Sometimes much more. (Elliott, August 1).

Minnesota: Very heavy in the northeastern section of the state, running as high as 75-100% in some of the best fields of Bliss

Triumphs in St. Louis and Itasca County. About 20% on Green Mountains, and very little on Cobblers and Rurals. Very little mosaic in Pipestone County and practically none in the Red River Valley. (Department of Plant Pathology, August 1).

Kansas: Several distinct cases of mosaic noticed in fields. Percentage would be a trace only. (White, July 15).

Montana: Showing up in usual abundance. Environmental conditions appear to have been factors in masking of symptoms except in old cases of long standing. It has been unusually cool and rainy in many sections. (Jennison, August 1).

Idaho: Mosaic is increasing in amount each year. Work has been started this year to secure mosaic free stock. Potentially if not at present, our most serious potato disease in Idaho. (Hungerford, July 15).

Washington: Mosaic is becoming increasingly prevalent, so much so that it is difficult to find a commercial field of any size that is free from the disease. (Dana, August 1).

Leaf roll

New York: Onondaga County. Leaf roll is particularly severe this year in all potato fields, especially Russets and other blue sprout varieties.(E. E. Cummings, July 31).

New Jersey: Common occurrence. (Cook, August 1).

Delaware: Very common in New Castle County with early crop. Sir Walter Raleigh, Rural New Yorker, and Green Mountain found susceptible June 16. (Adams, August 1).

South Carolina: Fairly general but damage slight. Certified seed has produced more plants free of the disease than market run seed. (Ludwig, August 1).

Ohio: Appears to be wide spread but definite reports lacking. (Detmers, August 1).

Idaho: Leaf roll serious in some fields in North Idaho. Evident association of spindle sprout with leaf roll. Also evidence that the disease spreads rapidly in this region. (Hungerford, July 15).

MORE POTATO WART IN MARYLAND

More gardens infested with wart have been found in the towns of western Maryland where the disease was located last year. The map on page 69 and the following summary by G. Hamilton Martin, Jr. gives the information.

"On August 9, at Lord, Maryland, Mr. F. F. Blaine, Field Assistant to the Plant Disease Survey, and Mr. P. C. Cissel of Maryland State found five scattered wart infested gardens in addition to the single one which was located in 1920. This brings the total findings of potato wart now to six at Lord. On the same day Dr. R. A. Jehle of the Maryland State College, who has been assisting in the survey work, located a wart infested garden in the extreme outskirts of Eckhart Mines, which brings the total up to three infested gardens in Eckhart Mines. These new findings, although in quarantined zones, are important because they show that wart is no doubt more prevalent in this section than the previous findings have indicated. In three of the wart infested gardens which were found last year, and which I examined again this year, I find wart either on the potatoes planted this year or on volunteers."

NOTES ON TIPBURN AND HOPPER BURN OF POTATOES

Vermont: Only traces of tipburn (physiological) have appeared so far here. Cool weather, an abundance of rain, cool nights in spite of brilliant sunshine in the middle of the day and more leaf hoppers than we had last year. Healthy plants have so far practically escaped except the extreme tip on some of the leaflets. (Lutman, August 1).

Delaware: Tipburn prevalent with early crop. (Adams, August 1).

South Carolina: Hopperburn fairly general in two rather widely separated parts of the Piedmont section at digging time. No reports from other parts of the state. (Ludwig, August 1).

Ohio: Hopper burn is widespread, occurring wherever spraying with Bordeaux mixture has been omitted or improperly applied. (Detmers, August 1).

Minnesota: Hopper burn first appeared on Bliss Triumphs on University Farm plots July 5. Injury moderately heavy at the present time. Heavy infections have been reported on early Ohios in Anoka County. Just beginning to show in the northern part of the state, but not serious. (Department of Plant Pathology, August 1).

South Dakota: Hopper burn in every field; 1-10%. Light, small or no loss. (Evans, August 1).

YELLOW DWARF OF POTATOES IN VERMONT

Regarding yellow dwarf recently described by Barrus and Chupp of New York, A. H. Gilbert of Vermont reports as follows:

"The new disease called "Yellow Dwarf" has been found in the state this year by the inspectors. It has been observed in several sections including Ira, but fortunately only in small amounts, one percent or less in most cases. Dr. M. F. Barrus of Cornell is joint author of the first description of the disease to be published."

INTERESTING REPORTS ON TWO TOBACCO DISEASES -

ANGULAR SPOT AND RING SPOT

The following important tobacco reports have been received from G. P. Clinton and F. D. Fromme:

Angular spot (Bacterium angulatum)

Connecticut: What appears to be this disease, new to the state, has been found on several farms in the Housatonic Valley. (Clinton, August 11).

Virginia: Becoming quite general in southern tier of counties, but not severe as yet. Rainfall has been quite general and plentiful during the past week and it is probable that late crops will suffer severe injury. The occurrence is quite spotted, very general in some counties and very slight in others. (Fromme, August 1).

Ring spot

Virginia: The disease which we call ring spot is unusually prevalent this year and is causing considerable alarm among the farmers. We have seen it to some extent in practically all fields visited, usually occurring in small amounts but occasionally a considerable percentage of plants is affected and the damage is appreciable. I have seen this trouble every year for the past seven years, but know very little concerning the cause or conditions under which it develops. It may be an unusual type of mosaic but the field evidence does not indicate this to be true with any degree of certainty. The farmers call it ring mosaic and vine pattern. (Fromme, August 1).

TOMATO WILT CAUSED BY FUSARIUM LYCOPERSICI

Virginia: Several reports from sections where previously known. Said to be quite general in Essex County. (Fromme, August 1).

New Jersey: Increasing in the state. Irregular infected areas are common in Camden, Burlington, and Gloucester Counties. Specimens of wilt have also been sent in from Bergen and other northern counties of the state. (Poole, August 1).

Arkansas: General and severe, appears in new fields each year. (Elliott, August 1).

REPORTS OF TOMATO LEAF SPOT

The following reports of Septoria leaf spot are at hand:

Connecticut: One complaint of injury becoming prominent, and probably considerable injury will appear to foliage before end of season on most vines. (Clinton, August 1).

New Jersey: This disease appeared in Gloucester County on the Earliana tomato June 15, about one month earlier than usual. It was found at this time also in a number of counties on the Baltimore and Bonny Best varieties. A rainy season caused rapid dissemination of the fungus about July 1, but its progress was since depressed on account of dry weather. (Poole, August 1).

Virginia: Appearing generally in western canning section and probably throughout the state. (Fromme, August 1).

LATE BLIGHT OF TOMATOES (PHYTOPHTHORA INFESTANS) REPORTED FROM NEW YORK AND VIRGINIA

New York: Late blight has been reported several times on tomatoes but we seldom or never have it in this state on the tomatoes unless they are grown adjoining an infested potato field. Evidently, we do not have the Phytophthora which is mentioned in some of the states farther south and which seems to be distinct from Phytophthora infestans. (Chupp, August 12)

Virginia: Severe in home gardens at Marion, Smyth County, on July 28. Has been present for about one week according to report. (Fromme, August 1).

TWO REPORTS OF TOMATO EARLY BLIGHT CAUSED BY ALTERNARIA

New Jersey: Up to this date, the Alternaria disease has not been as prominent as in the past few years. It is beginning to appear on the early tomato, and will no doubt be more serious later in the season on tomatoes grown for canning. (Poole, August 1).

Virginia: Quite destructive in early crop at Blacksburg, and probably general. (Fromme, August 1).

TOMATO MOSAIC

Connecticut: Have seen several cases of mosaic in tomato fields more especially on later leaves as if secondary infections. (Clinton, August 1).

New York: One field observed with 50% of plants badly diseases. (E. E. Clayton, July 24).

New Jersey: Very general in the state but severe in some sections, especially the filiform symptom. (Poole, August 1).

Louisiana: Abundant and doing considerable damage on many of the crops. Many fields showed a 50% loss. (Edgerton).

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FUSARIUM AND HELMINTHOSPORIUM BLIGHTS OF WHEAT

AS REPORTED FROM NORTH DAKOTA

Two interesting reports of these wheat diseases have recently been received from Miss Wanda Weniger of the North Dakota Experiment Station.

"Fusarium blight (Gibberella saubinetii) of seedlings was practically absent this spring, the only specimens received being from Beach in the extreme western part of the state, and from Fargo, from inoculated seed planted later than the general crop.

"Fusarium head blight is apparently absent, no inquiries having been received from over the state as is usually the case in other years. A very small percent of heads have been found infected at Fargo. Dry weather at blossoming time was more or less general for the state."

"Helminthosporium blight was rather common as a seedling blight in the spring.

"On heads and seeds, this trouble is much more abundant this year than last year. Red durums are particularly severely attacked in the Fargo region, and other durums both here at Fargo and from several scattered localities in the state have shown heavy infection. The disease has appeared in fields where no scab developed this year, although these same varieties have scabbed heavily in other years."

REPORTS OF WHEAT DISEASES FROM THE NORTHWEST

The following reports from the Northwestern wheat sections are of particular interest. Bunt appears to be especially important, and the reports of this disease from Washington and Oregon are noteworthy.

Bunt (Tilletia tritici and T. laevis)

Oregon: Present in Willamette Valley at least. Relative abundance not carefully determined. (Barss, August 1).

Appears to be worse than last year due to soil infection because of the dry weather that prevailed generally through the state all through the early fall. Loss of half a million dollars from smut is estimated from Umatilla County, the largest in wheat production in the state (Estimate by County Agent Bennion). (Barss, July 15).

Washington: One hundred eighteen counts of one thousand heads each made on sixty one farms scattered over eastern Washington show an average of 8.4% of smut in the crop. This may be taken as a fair average of the entire acreage. Counts ranged from none to 35% smut by head count. A number of smut explosions have occurred in threshing machines. (Dana, August 15).

Take-all (Ophiobolus cariceti)

Oregon: Present in the Willamette Valley but so scarce this year as to escape general notice. Damage of 1% found by Barss in

one field near Hillsboro is the most damage reported. (Barss, July 15).

Foot rot (Wojnowicia graminis)

Oregon: County Agent Avery at La Grande reports, "I think there is several hundred percent more than last year" in Union County. Not identified from any other section. (Barss, July 15).

Vegetative proliferation in the heads (unknown)

Oregon: From Amity, Dayton, Suver in the Willamette Valley have come specimens of wheat heads showing distorted vegetative shoot production from all the spikelets instead of normal seed. Extent of trouble unknown, probably not common or destructive. (Barss, July 15).

RYE ERGOT IN NORTH DAKOTA

Last year ergot was especially severe on wheat and rye in North Dakota. The following report from that state shows the situation this year:

"With rye harvest over, and many fields already threshed, there has been little report of the occurrence of ergot. Last year there was heavy infection, but this year it is very slight. Locally, there was some ergot, and also evidence of blighting of kernels due to infection by Claviceps. The weather has apparently been unfavorable for germination of sclerotia at Fargo, since various lots of them, overwintered out of doors and also indoors, failed to germinate in the field.

"Some spring rye was found heavily infected at Dickinson July 25, but the winter rye beside it was almost free from infection. Volunteer rye was generally infected. (Weniger, August 15).

BACTERIAL STALK ROT OF CORN REPORTED FROM ILLINOIS

The following report of bacterial stem rot as described by Rosen from Arkansas has been received from Illinois:

"Reported last year and this from Jackson and Monroe Counties. An additional report this season comes from Union County where two fields, one of 8 and one of 10 acres, show an average of 1% of the stalks killed. (Tehon, August 15).

We wish again to call attention to the fact that Professor Rosen, of the Arkansas Experiment Station, has for a number of years been working intensively on this disease and is anxious to receive specimens from as many localities in other states as possible, for comparison with the Arkansas material. Charles S. Reddy, of the Office of Cereal Investigations, 209 Eddy Building, Bloomington, Illinois, is also working on bacterial diseases of corn independently of Professor Rosen.

A BACTERIAL ROT OF CORN REPORTED FROM NORTH DAKOTA

North Dakota: A bacterial rot of field corn has been noticed for the first time in such quantity as this year. In the Fargo section, and also in many separate fields near Dickinson, the trouble I noticed was conspicuous and had attacked about 2% of the plants. The plants appear yellow, and the stalk is dwarfed, rotted with a soft rot which extends from near the ground line to include the undeveloped tassel. (Weniger, August 15).

THE ILLINOIS NATURAL HISTORY SURVEY REPORTS ON CORN DISEASES

Brown spot (Physoderma zeae-maydis)

"Present as far north in Illinois as Woodford County. It is not generally serious, although one instance of a 10% loss has been reported."(Tehon, August 15).

Stewart's disease

"Present where sweet corn is grown for canning. Not generally serious, although two reports show as high as 25% loss this season." (Tehon, August 15).

Root, stalk, and ear rots (Fusarium spp.)

"Present in serious quantities in Illinois. Loss this year may be as much as 8%. The yearly increased acreage of disease free seed, is tending to reduce the disease."(Tehon, August 15).

Rust (Puccinia sorghi)

"Present throughout the state, but is not reported common by our field men. Loss from this cause will be slight."(Tehon, August 15).

Smut (Ustilago zeae)

"Serious throughout the state. Loss will probably be between 3 and 5%."(Tehon, August 15).

LATE BLIGHT REPORTS FROM IMPORTANT POTATO STATES

Maine: Weather conditions during June and the early part of July were extremely favorable for the development of this disease and it appeared early and widely scattered. Dry weather during the latter part of July and early part of August appears to have checked it. To date it has done little damage and may not be serious if the weather remains reasonably dry. (Morse, August 18).

West Virginia: Quite generally distributed in Tucker, Randolph, and Upshire Counties. (Berg, August 1).

Michigan: Specimens received from Oceana County August 4. Rainfall deficient in southern Michigan but rains continue in northern peninsula. No epidemic expected in southern counties. Very dry and hot weather generally prevails over the lower peninsula at this time and the disease, where established, is checked temporarily at least. (Nelson).

Wisconsin: Just starting in northern part of state. More good sprayers in use than ever before. These were purchased privately to spray for leaf-hopper control. (Vaughan, August 1).

Minnesota: No late blight observed. (Section of Plant Pathology, August 15).

EARLY BLIGHT OF POTATOES

New Hampshire: First observed July 1. A few fields badly injured in the southern part of the state. (Butler, August 1).

West Virginia: Slight amounts observed. Apparently causes very little damage except in isolated cases. (Sherwood, August 1).

Wisconsin: Scattering infection in many fields of Green Mountain and Early Ohio. None seen on Rural New Yorker. Not serious. (Vaughan, August 1).

Minnesota: Early blight not very abundant. In one or two fields moderate infection was observed, (northwestern Minnesota). (Section of Plant Pathology, August 3).

North Dakota: Distinct target board lesions have been found in several fields this year, and I think it is safe to say that the disease is much more common than in previous years. Spraying with Bordeaux has not been commonly practiced. Only Early Ohios have been found infected. (Weniger, August 1).

Oregon: Not reported even from the Coast section this year. If present (as probable) is negligible in the state. (Barss, August 1).

BLACKLEG OF POTATOES ABUNDANT IN NORTHERN STATES THIS YEAR

These reports along with those given in other numbers of this Bulletin indicate unusual prevalence of blackleg in some of the more important late potato states:

Maine: More prevalent than for a number of years past. Attributed to the fact that the early part of the growing season was very wet. (Morse, August 18).

New Hampshire: More abundant in Coos County than in any other county. In Coos County present in native stock, in other counties usually present only on Maine seed. (Butler, August 1).

Wisconsin: More than for several years. Only a minor trouble in most fields. (Vaughan, August 1).

North Dakota: Blackleg is more severe in the state this year than we ever thought it would be. Early Ohios are severely attacked, many fields both in the Red River Valley and in the western part of the state being 30 and 50% infected. Tubers were found entirely rotted below the diseased vines as early as July 20, these being large tubers from early plantings. Blackleg and wilt are showing up in the same vines very frequently, as shown by pure cultures. In spite of dry weather for the past month, the slimy rot is very conspicuous on vines and tubers. (Weniger, August 1).

Oregon: General throughout the state. Extent of damage unknown. As high as 30% found in new soil in Clatsop County planted to Netted Gem from Yakima, Washington. Reported as serious in Polk County. Ten percent in Multnomah County according to Fruit Inspector Walker. McKay at Corvallis finds only a small amount even in experimental plots planted to seed from blackleg hills. (Barss, July 15).

TIPBURN AND HOPPERBURN OF POTATOES

West Virginia: Early potatoes in eastern and western sections of state suffered severely from tipburn. Leaf hopper and flea beetle infestations heavy. Trouble hardly so severe in higher altitude sections generally, but locally some severe cases seen. (Sherwood, August 1).

Wisconsin: Hopperburn serious on early varieties. Especially severe in southern and central counties. Rural New Yorker shows little burning at this date. (Vaughan, August 1).

Minnesota: Hopperburn observed in nearly every field in northwestern Minnesota, but not very far advanced in any. Hoppers not as abundant as in the southern part of the state. As much or more physiological tipburn and true hopperburn. (Section of Plant Pathology, August 15).

North Dakota: The past month has been unusually dry throughout the state, but particularly in the vicinity of Fargo. Tipburn began to show about a week ago. Leaf hoppers were observed in several fields doing considerable damage. Many fields are green and plants still growing, so that in all probability, we can expect reports of tipburn to be abundant. (Weniger, August 1).

WISCONSIN, MINNESOTA, AND OREGON REPORT ON POTATO MOSAIC

Wisconsin: Most ever seen. Some plantings of unselected Triumph stock show 100% infected plants. Even the Smith strain shows 2% on the Spooner Branch Station. (Vaughan, August 1).

Minnesota: Mosaic was observed in many fields in northwestern Minnesota. One field of Bliss Triumphs near Solway, Beltrami County, had approximately 50% affected plants. Another Triumph field in the same country had less than 1%. (Section of Plant Pathology, August 15).

Oregon: Generally distributed in all potato sections. Runs as high as 90 to 100% in some places and in large fields in Malheur County is reported as 50% by the County agent. Loss for state undetermined but heavy. (Barss, August 1).

A FEW REPORTS ON SWEET POTATO DISEASES

Black rot (Sphaeronema fimbriatum)

Mississippi: Not near as much black rot infection reported this season as last. Doubtless due to the strict quarantine measures now in force in the state and the general effort being made by many growers to eliminate diseases. (Neal, August 15).

Fusarium wilt (Fusarium batatatis (?)

Delaware: Fusarium wilt has been very prevalent this season. In some fields 70% of the hills are infected. (Adams, August 15).

Pox (Cystospora batata)

Delaware: Lesions appearing on young fleshy roots August 9. (Adams, August 15).

Cottony rot or southern blight (Sclerotium rolfsii)

South Carolina: Reported from four localities, in three of which plantsbeds were infected. (Ludwig, August 15).

White rust (Albugo ipomoeae-panduranae)

Delaware: Very prevalent this season and causing a shot hole effect on old leaves. (Adams, August 15).

EFFECTS OF PROXIMITY OF BLACK WALNUT TO TOMATOES

In 1921 Cook of New Jersey reported wilting of tomato vines in the vicinity of trees, (Phytopath. 11: 346. 1921). Any instances of this kind observed this season should be reported to the Plant Disease Survey for summarizing.

MORE REPORTS OF TOMATO LEAF SPOT

Delaware: First observed July 20. Very prevalent and generally distributed. Heavy rains have favored its distribution. (Adams, August 15).

West Virginia: Generally less than last year except in local sections on early tomatoes. Appeared rather late in eastern section and spread slowly due to generally dry weather. (Sherwood, August 1).

Kentucky: In Henderson, Daviess and McCracken Counties in canning fields of Greater Baltimore. Defoliation so severe that second clusters of fr

ripen prematurely or small, in some cases sunburning to the extent of being utterly worthless. More rain than usual. Crop cut from 25 to 50%. (Gardner, August 15).

Ohio: Not much in evidence to date, a single outbreak in Lorain County reported. (Young, August 15).

Michigan: Common on late tomatoes. Checked by dry weather in southern Michigan. Effectively controlled by Bordeaux plus resin-fish-oil-soap. (Nelson, August 15).

WEST VIRGINIA, KENTUCKY, AND OHIO REPORT ON FUSARIUM WILT OF TOMATOES

West Virginia: I have seed considerably more than last year, but only in local instances has much damage been caused. (Sherwood, August 1).

Kentucky: Found in Henderson and McCracken Counties. Rather good season (rain) and wilt not yet so prevalent as in 1921. From 5 to 15% except in fields known to be badly infected, up to 75%. United States Department of Agriculture Norton found over 90% free and Norduke wholly so in test field. Norduke not fruiting freely in Henderson County; doing better in McCracken County, drier season. (Gardner, August 15).

Ohio: Numerous reports. Very destructive where susceptible varieties are being grown on infected soil. Considerable interest in resistant varieties manifested by seed dealers and truck growers. (Young, August 15).

REPORTS OF OTHER TOMATO DISEASES

Blossom end rot

Kentucky: Very prevalent in Fayette and Jefferson Counties where rains were relatively light. Upper clusters more affected than first settings of fruit. Earliana variety almost 100%. Bonny Best probably 25%. (Gardner, August 15).

Very common and destructive in dry areas of state. Much more than usual. (Valleau, August 15).

Bacterial spot (Bacterium vesicatorium Doidge)

Michigan: Fifteen rows of Earliana grown in East Lansing from seed obtained from various sources quite generally affected with spot. Not noted on other varieties. (Nelson, August 15).

Grand Rapids disease (Aplanobacter michiganse)

Michigan: Specimens received from Grand Rapids July 24. Commonly the cause of wilted plants in Grand Rapids greenhouses. (Nelson, August 15).

Western yellow blight

Washington: Abundant in the Clarkston section. Not as prevalent about Pullman as usual. No reports from the central irrigated valleys. (Dana, August 15).

BEAN DISEASE REPORTS

Anthracnose (Colletotrichum lindemuthianum)

Vermont: Occasional infections on leaves and stems but the very dry July (since July 3) has checked it and the pods are not diseased to any extent, although more of course than last year when it was hard to find a specimen. (Lutman, July 15).

New Jersey: Very common but not more destructive than usual. (Cook, July 15).

West Virginia: I have observed generally less than last year, though in some local sections in central part of state very heavy infection occurred. (Sherwood, August 15).

Oregon: Not reported this year except from Umatilla where Bennion reports it as slight. (Barss, July 15).

Mosaic (cause undetermined)

Minnesota: The only reports we have of bean mosaic are from Ramsey County. Careful counts have been made in home gardens and truck gardens in this region, and 8-50% of the plants have been found to be infected with mosaic. (Section of Plant Pathology, July 15).

Idaho: Mosaic on beans about as usual. This is the most serious bean disease in the state. (Hungerford, August 1).

Oregon: Reported from Marion, Benton, Umatilla, and Klamath Counties. Probably general but damage resulting difficult to estimate. (Barss, July 15).

Root rot (cause unknown)

Kentucky: On several occasions I have examined the root systems of bean plants at about the time of first podding or after and have found the fiberous roots dead. The plants become yellow and sickly. (Valleau, August 15).

DOWNY MILDEW OF CUCURBITS

Cucumber

Delaware: Prevalent in late planted fields. (Adams, August 15).

Florida: Very important, known to occur near Sanford and southward. First appeared in March at Winter Garden and later at Sanford, most injurious from March to June, during the heaviest fruit season. Weather dry, but heavy dews favored development. (Foster, August 7).

Mississippi: Reported from Prentis County as causing considerable loss in gardens. (Neal, August 1).

Cantaloupe

New Jersey: Abundant. (Cook, August 15).

Delaware: First observed July 26. Has been very prevalent this season and on late planted fields has cut yield 50%. (Adams, August 15).

Georgia: Downy mildew has been most serious in the southern part of the state. The extremely humid summer has greatly facilitated its growth and its spreading. Spraying has not been very effective on account of the rains. (McHatton, August 1).

Watermelon

Delaware: Very prevalent this season and will prevent normal yield in many fields. (Adams, August 15).

WATERMELON ANTHRACNOSE (Colletotrichum lagenarium)

Delaware: Leaf and fruit infection August 4. Very prevalent. (Adams, August 15).

Virginia: General and especially severe following prolonged wet spell. (Fromme, August 15).

West Virginia: Fruits in market badly pitted and yellowish. The yellowing indicates that the foliage had been killed so that the melons were exposed to strong sunshine. Quite a number of the melons were also undeveloped at the stem end. (Morgantown). (Sheldon).

South Carolina: Very prevalent in the commercial watermelon growing section. The observations were made too early in the season to give an estimate of the extent of loss, however. (Ludwig, August 15).

Georgia: Very serious in 1922; common in practically all fields causing losses of from 20 to 100%. Many seeds treated but no spraying done and the rainy season played havoc. Not possible to estimate percentage loss to whole crop. (McHatton, July 15).

Mississippi: Many reports have been received this season as to the prevalence of anthracnose. The disease was especially severe at Sandersville, Jones County, resulting in a high percentage loss. The season has been very favorable for the development of the disease. (Neal, August 15).

A FEW REPORTS OF WATERMELON WILT

Virginia: More complaints than I have had in any previous year. (Fromme, August 15).

South Carolina: Present in several places and serious where it occurs. (Ludwig, August 15).

Georgia: General in gardens and where rotations are not followed. Commercially not so serious. (McHatton, July 15).

Arizona: Specimens sent in from Glendale. Considerable loss in Salt River Valley reported to be due to this disease. (Brown, June 20).

CANTALOUPE DISEASES

Leaf blight caused by Alternaria brassicae nigrescens

Georgia: Cantaloupes badly affected by Macrosporium blight. Some fields ruined. Many immature cantaloupes being shipped. (Robb, June 8).

Delaware: Generally prevalent but not a serious disease under our conditions, July 21. (Adams, August 15).

Bacterial wilt caused by Bacillus tracheiphilus

Delaware: First observed July 20. Very little of this disease appeared. (Adams, August 15).

West Virginia: Very prevalent and destructive. This trouble on both cantaloupes and cucumbers sometimes causes almost total destruction of crop. (Sherwood, August 15).

Ohio: Of general distribution in the state, apparently quite destructive this season. (Young, August 15).

Michigan: Very generally reported in southern Michigan. Striped beetles abundant again this year and active in spreading the disease. (Nelson, August 15).

Anthracnose caused by Colletotrichum lagenarium

South Carolina: Widespread in commercial cantaloupe growing section in southern part of the state. Observations were made by L. E. Tisdale before the harvest season and it is not possible to say how much damage was sustained. (Ludwig, August 15)

Rot caused by Sclerotium rolfsii

South Carolina: Reported from one farm as causing a reduction of about 20% in yield. Apparently not serious in many places but quite common in small amounts. (Ludwig, August 15).

Leaf spot caused by Cercospora cucurbitae

Delaware: Very prevalent June 28. (Adams, August 15).

Mosaic (cause undetermined)

Delaware: First observed in a field of transplants (Rocky Ford) June 29. Very prevalent. (Adams, August 15).

SUGAR CANE MOSAIC SITUATION IN MISSISSIPPI

"The disease is now present in practically all counties south of Meridian and Jackson, ranging from a trace to 100% in these fields. No data as to amount of damage." (Neal, August 15).

VALLEAU OF KENTUCKY REPORTS ON TOBACCO DISEASES

Mosaic (cause undetermined)

"Mosaic is by far the most important leaf disease in the Burley section of Kentucky this year. In 56 fields where counts have been made the plants have been infected to the extent of 14%. In some cases infection has run as high as 90%. In 23 of the fields infection was 2% or less. These counts were made at a time when the mosaic could be definitely attributed to infection at setting time, indicating seed bed infection. In several cases the disease was found in the beds and in one case more carefully studied mosaic Physalis virginiana and Solanum carolinense were found in a bed from which approximately 30% of the plants showed infection within a month. We have transferred mosaic from Physalis virginiana, Solanum carolinense, tomato, tobacco, and Physalis heterophylla to tobacco under controlled conditions and have failed to transfer it from soy beans and pokeweed. The mosaic causes losses for two reasons. First, the plants infected at setting time are all small and stunted; and second, there is very severe burning of the lower leaves of these plants and also on the lower leaves of plants infected later in the field. This type of burning has been improperly spoken of as wildfire by many growers in the Burley section this year.

"In the hilly sections of Kentucky where there is an immense area open for seed beds where tobacco has never been grown, mosaic is difficult to find in many fields. In 15 fields examined in Marion County mosaic was serious in only one." (August 15).

Angular spot caused by Bacterium angulatum

"In the Burley section angular leaf spot is present in over half of the fields, but causing very little injury because of the almost continuous dry season. In the Dark section in western Kentucky, reports of injury from the bacterial leaf spot diseases are common. They have had a wet season." (August 15).

Root rot caused by Thielavia basicola

"Root rot of tobacco is causing its usual injury in the Burley section of Kentucky. A survey of 106 fields up to the present has shown 61 infected and 45 with no sign of root rot. A record was made in some cases of the history of the field. Old blue grass sod never in tobacco, 2 infected and 19 uninfected fields; old blue grass sod in tobacco in 1921 and 1922, 7 infected and 2 uninfected fields; tobacco for past seven years, 30 infected and 11 uninfected fields; no tobacco in past seven years, but in soil previously, 9 infected and 6 uninfected fields.

"Through Mr. Ralph Kenney, we have tested out a few resistant strains of stand up white Burley. Of 66 of the demonstrations so far tabulated the resistant selection was larger than the common variety in 38 cases and the same as the common variety in 28 cases. The common variety strain was larger than the resistant in 2 cases. The value of the resistant stand up types is very evident." (August 15).

Wildfire caused by Bacterium tobacum

"(Burley section) Wildfire has been found in about 8% of the fields so far examined. It was causing damage only in a single field." (August 15).

BROWN ROT OF PEACH AS REPORTED FROM VARIOUS STATES

New Jersey: Abundant. (Cook, August 15).

Delaware: Very prevalent on Belle of Georgia and Hale. Fruit infection first observed June 7. (Adams, August 15).

Virginia: About average severity. (Fromme, August 15).

Kentucky: This disease was serious in early plums and peaches, but those ripening at this time are practically free from rot. Weather is dry and hot. (Valleau, August 15).

South Carolina: Some blossom blight and twig cankers on Station farm. Fruit rot apparently less than last year. No observations at other locations in the state. County agent of Florence County reports the disease very bad. (Ludwig, August 15).

Georgia: General and serious. Spraying controlled in commercial crop; in small and unsprayed plantings practically a total loss. (McHatton, July 15).

Mississippi: Widely prevalent in the state where spraying schedules have not been consistently followed. Damage at least 20 to 25% for the entire state. Some orchards observed this season which were a total loss from brown rot infection. (Neal, August 15).

Arkansas: More than usual. Common on unsprayed fruit. (Elliott, July 1).

Illinois: Has caused no injury on the fruit in the orchards to date. (Anderson, July 1).

PEACH SCAB CAUSED BY CLADOSPORIUM CARPOPHILUM

New Jersey: Abundant. (Cook, August 15).

Delaware: Very prevalent, first observed June 21. (Adams, August 15).

Virginia: Unusually prevalent. (Fromme, August 15).

Kentucky: Coincident with crop. Very serious. Where spraying is not practiced, peaches dry out before ripening. (Valleau, August 15).

Georgia: General. In commercial orchards 5-10% infection. In uncared for plantings from 80-100% infection. (McHatton, July 15).

Mississippi: Reported from Stone, Lauderdale, Washington, and Grenada Counties. Mostly twig infection. Damage not given. As a rule, the disease is less this year. (Neal, August 15).

Arkansas: Much more severe than usual; on all unsprayed fruit. Especially severe on Belle of Georgia. (Elliott, July 1).

Illinois: Scab has been unusually prevalent this season, but is of little economic importance. There may be local losses this season. Unsprayed orchards of susceptible varieties will suffer heavy losses. These are few. (Anderson, July 1).

REPORTS OF BACTERIAL SPOT OF PEACH

Delaware: *Bacterium pruni* was a serious leaf infection in May and June and subsequent defoliation has prevented normal growth of fruit. Complete fertilizer with summer application of nitrate of soda has assisted in checking disease. A spring and summer application of nitrate of soda has been effective on light soils. (Adams, August 15).

South Carolina: This seems to have been quite widespread this season and in some places to have caused considerable defoliation. My observation on some nitrate treated and check plots this season leads me to believe that fertilization with nitrate does not induce greater resistance. It does stimulate leaf production, though, so that the same loss of tissue due to the spots or to defoliation is not so serious to the fertilized trees. A better control measure is needed, but fertilization is worth while. Seemed to be worse early in the season this year. (Ludwig, August 15).

Kentucky: Caused severe injury to leaves in early part of season. Many trees in Station orchard nearly defoliated. These put out new leaves free from infection and are ripening their fruit normally. Very few fruits are spotted. (Valleau, August 15).

Mississippi: Reported from Harrison, Lauderdale, and Madison Counties. Damage not given. (Neal, August 15).

Arkansas: Common on poorly kept trees. (Elliott, July 1).

Illinois: Not as serious in southern portion of state as anticipated. Central section shows serious infection on leaves. The disease appeared on the fruit about June 20. Do not anticipate much loss. (Anderson, July 1).

OTHER PEACH DISEASES

Root knot caused by Heterodera radicicola

South Carolina: Present. No data on loss. (Ludwig, August 15).

Mississippi: Very common and serious on nursery stock. One nursery near Meridian revealed at least 75% infection. On the whole a very serious disease problem for the nursery men in many localities of the state. (Neal, August 15).

Mildew caused by Sphaerotheca pannosa

Oregon: Reported as serious on several Elberta trees in a Hood River orchard. Specimen also received from Washington County. In general, not economically important. (Barss, July 15).

Blight and fruit spot caused by Coryneum beijerinckii

Oregon: General throughout western Oregon. Twig and bud damage last winter about average. Dry spring weather has resulted nearly everywhere in apparent absence of fruit spotting thus far. Easily controlled by early fall spray of Bordeaux but so much neglected that in some sections unsprayed trees may suffer 35% damage. (Barss, July 1).

Phony peach (cause unknown)

Mississippi: A typical case of the so-called "Phony" disease was observed this season near Enterprise, Clark County. (Neal, August 15).

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VEGETATIVE PROLIFERATION IN THE HEADS OF WHEAT REPORTED

BY E. B. MAINS

"In the September 1st issue of the Plant Disease Survey Bulletin I note a statement by Barss concerning the distorted vegetative shoots, produced instead of normal seed from spikelets of wheat. A similar phenomenon occurred in the greenhouse with us this spring. One variety of wheat, Norka, shows this development quite regularly, the heads taking upon themselves a peculiar branched and rebranched appearance. This was noted only in this one variety. Other wheats grown under similar conditions do not show such characteristics. We rather thought that it was the hot conditions of the greenhouse affecting this one variety in particular."

CORN SMUT

Reports of the common corn smut caused by *Ustilago zeae* have been received from a large number of states. In general, the reports indicate about the usual amount of smut, but those from South Carolina, Florida, and Louisiana indicate less infection than usual. In Ohio R. C. Thomas reported a few fields of Golden Bantam sweet corn that showed 100% infection.

Collaborators in Kansas and Arizona report heavy losses from this disease. As high as 60% infection can be found in some fields in Kansas, according to L. E. Melchers.

REPORTS ON CORN ROOT ROT

The following reports of corn root rot caused by *Gibberella saubinetii* or by *Fusarium* spp. have been received from scattered states as follows:

Connecticut: Probably average amount. (Clinton).

Delaware: Has not been as prevalent this season. Smaller percentage of premature stalks this season as result of root rot infection. (Adams, September 1).

Maryland: Corn root rot is very prevalent in the southern counties of the Eastern Shore of Maryland this year. I have seen several fields in which twenty-five to seventy-five percent of the plants were affected. (Jehle, July 24).

Ohio: Impairment of stand from seedling infection most evident in those sections of the state where the soil is not naturally adapted to corn growing. On the natural corn soils the stand is good. In the counties where the corn is most largely grown there was much interest in seed testing and much diseased seed was discarded. A considerable proportion of the seed tested was found to be infested with Fusarium or Diplodia or both. Late rot infection of maturing stalks not yet reported. (Young, August 15).

One field of two and one-half acres investigated showed 90% infection. (Thomas, September 1).

Missouri: Isolations from a number of corn plants show that Fusarium moniliforme is the organism concerned in most cases. (Hopkins, July 5).

Kansas: Commonly present in many fields over the state. Corn severely injured from the heat during August so that it is somewhat difficult to state the amount of damage which is due to root rot. (Melchers, August 15).

DIPLODIA EAR ROT OF CORN REPORTED FROM DELAWARE AND LOUISIANA

J. F. Adams, of Delaware, reports on September 1 that considerable ear rot is appearing in stands of field corn, and C. W. Edgerton, of Louisiana, on the same date states that the disease is very common and severe in the southern part of that state where the rainfall has been heavy, the actual loss not far from 10% according to Edgerton.

BROWN SPOT OF CORN COMMON THIS YEAR

Judging from reports received, the disease of corn caused by Physoderma seems to be very common throughout the South this season. In Illinois, also, the disease seems to be more prevalent than commonly, it being prevalent around Bloomington and is reported by L. R. Tehon as far north as Ogle County. This is the northernmost report for Illinois. Mr. Tehon states that from 15-30% infection occurred in a few fields in that county.

CORN RUST (PUCCINIA SORGHI)

Light infections of this rust have been reported this year from Florida, Louisiana, Illinois, and Minnesota. Both sweet and field corn are affected.

CONSIDERABLE HELMINTHOSPORIUM LEAF SPOT OF CORN REPORTED

Connecticut: Quite bad and much more prominent than usual. Probably the worst trouble of corn this year. (Clinton, September 1).

Delaware: This spot has appeared on field corn throughout the state. All prematured leaves show considerable infection by this fungus. (Adams, September 1).

West Virginia (Morgantown): Rather common on early varieties, but too late to cause much harm. (August 9, Sheldon).

RECENT APPLE SCAB REPORTS

The following reports on the present scab situation show that this has been a bad scab year in the northeastern sections of the country:

Massachusetts: More serious than it has been for years. Especially bad on McIntosh, but also very prevalent on other varieties. I find it on trees and in places where it has never been noticed. (P. J. Anderson, September 1).

Connecticut: Very bad; one of our worst years. (Clinton, September 1).

New Jersey: Very abundant in some localities. (Cook, September 1).

West Virginia: I have observed some striking examples of heavy infection where pink spray was omitted, especially in central and western sections of state. Early infestation in eastern Panhandle was comparatively light due to dry weather; but in other sections, early infection heavy. (Sherwood, September 1).

Arkansas: Considerable scab on most susceptible varieties. (Elliott, September 1).

Ohio: Apple scab has developed more generally and more seriously than in normal seasons. The period of infection as determined by spore dispersal dates at Wooster by R. C. Thomas, Assistant Botanist, covers a wide range of such possible infection. This made it unlikely that any pre-blossom spray treatment would be fully effective in controlling the disease on fruit. The recurrent showers have led to very extended infection of fruit and later foliage, so that it is very seldom so serious a mid-summer and late summer infection of apple foliage from scab has occurred in Ohio. Even where fruit infection control of the scab was obtained, later season infection of the foliage has resulted with full promise of severe infection under favorable conditions for 1923. (Selby, September 1).

Minnesota: Moderately heavy. Infection averaging about 10% in the Minnetonka fruit growing region. In some cases the damage on the fruit amounted to 5% loss. (Section of Plant Pathology, September 1).

North Dakota: About the usual amount, as nearly as we can tell from reports of growers. Not abundant in well kept orchards or isolated well cared for trees. (Weniger, September 1).

SEPTEMBER 1 REPORTS ON FIRE BLIGHT OF APPLE

Massachusetts: Twig blight type, very prevalent; more so than usual. (P. J. Anderson, September 1).

Connecticut: At least the average amount. (Clinton, September 1).

Ohio: Earlier indications of severe later killing of trees and branches of pome fruits from fire blight have not been realized. In general, the spread of infection of apple trees has been quite limited, although the prevalence of the fire blight attack has been very general and we might say almost severe. There has been the reappearance of renewed infection which has usually accompanied equally serious early attacks of the apple. (Selby, September 1).

Minnesota: Since August 15 fire blight has been reported from Washington and Wright Counties, the injury being rather severe in the latter. At the present time there is only a trace of fire blight in most orchards in Hennepin and Ramsey Counties although one orchard has been observed in which 90% of the trees probably were infected. (Section of Plant Pathology, September 1).

North Dakota: There is still abundant evidence of the severity of this disease this year. Some trees under observation which were somewhat attacked in previous years and then treated carefully in the hope of destroying the disease, started out fine in spring and did not show signs of twig infection until a few weeks ago. (Weniger, September 1).

BITTER ROT OF APPLES

This disease has been reported as occurring scatteringly on apples from Connecticut southward to Georgia, and in Arkansas.

Connecticut: One complaint; apparently above the average. (Clinton, September 1).

Delaware: First observed June 16 on Maiden Blush. Has been very common on Transparent, July 5. (Adams, July 15).

Since last report has become very prevalent on late apples. Wealthy, Nero, Grimes, Winter Banana, Stayman, Stark, Chenango, and Rome have shown infection. Most prevalent in orchards receiving no spray in July. (Adams, September 1).

Virginia: Appearing scatteringly on susceptible varieties in the Roanoke and Staunton sections. Not of much economic importance,

however, at this time. A few unsprayed apples of a susceptible sort showed a heavy percentage of affected fruit. (R. J. Haskell, September 1).

West Virginia: About usual amount observed so far. Very local and on particularly susceptible varieties. (Sherwood, September 1).

South Carolina: Noted in station orchard and bad infection in one sample submitted for diagnosis. Probably widespread. Some county agents report it as severe. (Ludwig, September 1).

Georgia: Due to rainy season generally reported. Causing considerable loss, hard to estimate percent. (McHatton, July 15).

Arkansas: Severe in some orchards. Dry weather has checked it during last month. On Grimes, Ben Davis, King David, and Jonathan. (Elliott, September 1).

Ohio: Bitter rot has apparently not developed to marked extent during the season of 1922, but was collected with apple blotch on specimens of Maiden Blush apple in Ross County, July 28. Other scattered infections have been reported, but no general outbreak. (Selby, September 1).

SOME RECENT CEDAR RUST REPORTS

Massachusetts: More than usually prevalent, especially on Wealthy, but also on Winter Banana and to some extent on other varieties. (P. J. Anderson, September 1).

Connecticut: At least as bad as average years. (Clinton, September 1).

Maryland: Unusually severe not only on Eastern Shore but all over state, attacking both fruit and leaves. Many specimens received at Experiment Station, College Park. (Jehle, July 28).

South Carolina: One slight infestation noted since last report. (Ludwig, September 1).

Ohio: Scattered occurrence over the state of infection on fruit and foliage of the apple shown in southern counties where red cedar is permitted to occupy adjacent grounds. (Selby, September 1).

Minnesota: Only very late infections have been found in Carver and Hennepin Counties. (Section of Plant Pathology, September 1).

DELAWARE, OHIO, AND ARKANSAS REPORT APPLE FRUIT SPOT

Phoma pomi has been reported by collaborators as follows:

Delaware: First observed August 5. Has become very prevalent on fruit

receiving no July spray. Very little infection found last year and its prevalence this year correlated with lack of spraying and heavy rainfall in July. The Jonathan, Rome, and Grimes show greatest susceptibility. (Adams, September 1).

Arkansas: Considerable on some Jonathan, Grimes, and King David. Not seen on other varieties. Worse in some orchards than in others. Most severe on inside fruit that had not been well covered. (Elliott, September 1).

Ohio: This disease was first observed this year on August 10 and found only in orchards where no mid-July spray was applied. Upon such varieties as Jonathan, Mann, and others of the green type, infection has been noted to be severe. (Thomas, September 1).

APPLE BLACK ROT REPORTS OF SEPTEMBER 1

Maryland: Quite a lot of black rot on fruit of Williams in Maryland. Earlier in season was observed as quite severe on Red Astrachan. (Jehle, July 28).

West Virginia: About usual amount observed so far on fruit. Better spraying generally than last year apparently reduced damage following worm injury, but considerable infection locally due to frost injury at calyx. Leaf spot exceedingly heavy in some places. (Sherwood, September 1).

Arkansas: Rather common as a calyx and stem end rot. On a whole less than usual,due to less coddling moth injury. (Elliott, September 1).

Ohio: For Ohio the occurrence of black rot in marked infection has been rather less than in 1921, although the work of R. C. Thomas determined, as reported July 1, that the time of spore discharge at Wooster was coincident with that of apple scab. The later season's developments have not quite maintained expectations of equal infection with that of 1921 from the black rot fungus upon foliage. Probably the later development of the season will change the estimate. Black rot infections upon fruit have been numerous and conditions are fully ripe for increased development at any time during the remainder of the season of 1922 or following. (Selby, September 1).

Minnesota: Common on Greenings in Washington and Houston Counties. Infection ran as high as 5% on the fruit. (Section of Plant Pathology, September 1).

APPLE BLOTCH CAUSED BY PHYLLOSTICTA SOLITARIA

West Virginia: More blotch this year than usual. Has been on the increase due to lack of spraying at proper time. Severe on Northwest Greenings and Dutchess. Observed also on Baldwin, Stark, Rome Beauty, Ben Davis, Spitzenburg, and others. Local rather than general. Greenings and

Dutchess apparently very susceptible to canker. (Sherwood, September 1).

Arkansas: On Ben Davis, Grimes, Oliver, Missouri Pippin, Limber Twig, and some other varieties. Rather bad in some orchards. Unsprayed Ben Davis badly injured. (Elliott, September 1).

Ohio: Apple blotch has, up to this date, showed less evidence of occurrence than in previous seasons. Indeed marked demonstrations of the efficiency of the Bordeaux mixture sprays in control of apple blotch have confirmed the judgment of those who are conducting the spray tests, namely; first, apple blotch is not a matter of north or south in its infections in the state, being distributed entirely across the state; second, that even in the most pronounced infected areas, as notable in Clermont County, southwestern Ohio, the thorough going work of the apple growers applying the spray control developed by the Extension Service under Prof. F. H. Beach, has shown complete success, even with such susceptible varieties as Smith Cider and Mann. This was well shown in the apple growers tour in Clermont County, July 26. Satisfaction is expressed in this outcome. (Selby, September 1).

BROWN ROT OF APPLES REPORTED

Rotting of apples due to *Sclerotinia cinerea* is reported from Massachusetts, Delaware, West Virginia, and Ohio. Early varieties, especially Red Astrachan, are mentioned as especially affected.

WEST VIRGINIA REPORTS MEASLES OF APPLES

According to Collaborator Sherwood, this trouble is increasing and apparently causing considerable damage in certain sections of southeastern West Virginia. Many samples have been sent in to the Experiment Station and Mr. Sherwood has frequently observed the trouble.

BITTER PIT, DROUTH SPOT, AND RELATED TROUBLES

Damage from these non-parasitic diseases is reported from Delaware, Virginia, and Arkansas. York Imperial, Grimes Golden, and Jonathan are mentioned as especially affected. A large proportion of the Yorks shipped from Virginia this year will show spots of this nature.

TEXAS ROOT ROT REPORTED ON APPLE IN ARIZONA

According to J. G. Brown, about 30% of the trees in the 200 acres of apples in Greenlee County, Arizona are affected with this disease. It probably causes losses in other counties of the southern part of the state.

RECENT REPORTS OF BROWN ROT OF PEACHES

Connecticut: Too early for late varieties, but on the whole at least average amount. (Clinton, September 1).

Pennsylvania: Appeared unusually early, June 7, Adams County. Reports indicate about average losses. (Thurston, July 31).

Maryland: Brown rot severe on all unsprayed fruit. Sprayed (self-boiled and atomic sulfur) trees the disease was well controlled. A few are dusting. (Jehle, July 28).

Arkansas: More than usual in unsprayed orchards. (Elliott, August 15).

Ohio: Weather conditions have been favorable for infection and brown rot is general with complete loss in many orchards not sprayed. Very severe twig blight is prevalent in southern Ohio. In orchards sprayed with self-boiled lime sulphur or with lime sulphur glue, the rot is held in good control. The importance of a spray two to three weeks before harvesting is very apparent, and this is the first year that such practice is being generally followed in certain peach districts of the state. (Thomas, September 1).

Illinois: Brown rot has not been very serious in Illinois this year due in part to the dry season. Efficient control of curculio has also reduced this disease. I have seen only one orchard, and this a very much neglected one, where brown rot was serious. Few cases seen in the market as compared with other years. (Anderson, September 1).

Kansas: Present in every peach orchard. Severe losses in many sections. Average loss 10% of crop in unsprayed orchards. Amsden variety very susceptible. (Stokdyk, September 1).

LESS PEACH BLIGHT IN WASHINGTON THIS YEAR

According to B. F. Dana of Pullman, Washington, the infection of peaches by *Coryneum beijerinckii* is very much reduced over normal years. The actual loss this season in commercial orchards will be small.

REPORTS OF BACTERIAL SPOT OF PEACH

Arkansas: Quite common, and severe on ill-kept trees. (Elliott, August 15).

Illinois: Serious in southern Illinois on both fruit and foliage. Entirely absent in many orchards while others show 30-50% infected fruit. Average on Elberta and Hale about 5% for fruit infection. Leaf infection not yet causing very serious defoliation, although most orchards show severe infection. About 50% of foliage lost in some few orchards observed on August 20. In our variety orchard at Urbana, representing about 50 varieties, the Hale and Elberta were the only ones showing any appreciable loss from shot hole and few other varieties were

infected. Hale seems to be more susceptible than Elberta in most orchards. At the University farm the percent of fruit infection on these varieties was about equal. (Anderson, September 1).

Kansas: General infection throughout state. Severe in some sections.(Stokdyk, September 1).

SERIOUS LOSS OF PEACHES IN ILLINOIS FROM A FRUIT SCALD OF UNCERTAIN CAUSE

The following accounts of injury to peaches by H. W. Anderson are of interest. Other collaborators who have made observations on similar troubles this year should report them to the Survey for summarizing.

"Numerous orchardists south of Carbondale report serious loss due to a peculiar condition of the fruit. This shows as a dark sunken spot from one-fourth to one-half inch in diameter near the stem end on the upper surface. Gum often exudes. The flesh is dry immediately below the lesion but not far into the pulp. Found almost exclusively in poorly nourished orchards.While the cause has not been definitely established, it is supposed to be due to a few very hot days the latter part of June."(July 1).

"Since my last report on this disease, I have found it general throughout the south half of the state, but worse in the extreme south. It has caused more loss than any one factor this season. I still believe it is due to weather and spray injury. Would like to hear from other states." (September 1).

PREMATURING AND UNEVEN SIZE OF PEACHES

Connecticut: A good many trees are showing premature fruit from yellows or some other cause. (Clinton, September 1).

Illinois: J. H. Hale variety in many orchards showed a dozen or 20 peaches on each tree of enormous size while all the rest were very small - almost an inch in diameter. This seems to be characteristic of the variety, but trees in the same orchard showed uniform size. This is not the "little peach" disease of Smith et al. (Anderson, September 1).

INFORMATION DESIRED ON THE PREVALENCE OF RASPBERRY MOSAIC AND LEAF CURL

In a recent letter, J. E. Howitt, of the Ontario Agricultural College says that Ontario raspberry growers are considerably concerned over the prevalence of mosaic and leaf curl in their plantations. Reports of mosaic are also at hand from New York, Ohio, and Minnesota, but definite information as to the relative importance of the two troubles, or regarding losses or success of control measures, have not been received. Any information of this kind from those who have made observations on these diseases this year will be of much value to the pathologists of the country.

REPORTS ON COTTON DISEASES FROM SOUTH CAROLINA, LOUISIANA, AND ARKANSAS

Wilt (Fusarium vasinfectum)

South Carolina: Three records so far this year. Gradually working its way into the Piedmont section, where, until recently, it has been quite rare. I believe that its migration into the Piedmont supports Elliott's belief that it is disseminated more or less in the seed. Many sandy soils in the Coastal Plain have to be planted in resistant varieties in order to produce a crop. (Ludwig, September 1).

Louisiana: Common and destructive in some localities. Apparently the damage caused by this disease is decreasing from year to year. (Edgerton, September 1).

Arkansas: Common and widespread. Severe in eastern Arkansas. (Elliott, September 1).

Anthracnose (Colletotrichum gossypii)

South Carolina: Apparently worse than last year. Some county agents report 5% or more of loss. The average is probably less. (Ludwig, September 1).

Louisiana: Common and causing about the ordinary loss. (Edgerton, September 1.).

Angular leaf spot (Bacterium malvacearum)

South Carolina: Widespread but apparently not serious except in isolated cases. (Ludwig, September 1).

Louisiana: Very common throughout the season on both leaves and bolls. (Edgerton, September 1).

Arkansas: Very spotted. Some fields badly attacked, others much less so. (Elliott, June 23).

POTATO LATE BLIGHT REPORTS AS OF SEPTEMBER 1

Massachusetts: Became noticeable about the first of August and has spread rapidly and been very destructive. I have never seen it so prevalent in this state during the seven years I have been here. Wet, cool weather has been ideal throughout the month for its spread. Most of the vines died in a very short time. Vines alive now only where they have been sprayed. (Anderson, September 1).

Connecticut: Much more than usual but not so bad as expected from early start. Some not reported so far, and probably considerable in late varieties. (Clinton, September 1).

New York (Long Island): Disease has been general over Island and in only a

few exceptional cases have farmers successfully combatted it by spraying or dusting. Indeed, owing to favorable conditions for rot late in the season, many who sprayed most thoroughly will suffer the most severe loss from late blight rot. (Clayton, August 26).

New Jersey: Throughout central part of state on early crop. (Cook, September 1.).

Maryland: Found on the early crop on the Eastern Shore. (Jehle, July 28).

Oregon: No authentic reports so far. The exceedingly dry conditions during May, June, and July as well as August throughout the state did not afford the disease any chance for development. (Barss, September 1).

REPORTS OF FUSARIUM WILT OF POTATOES

South Carolina: Reported by Mr. L. E. Tisdale of the Crop Pest Commission, as being somewhat general and causing moderate to slight damage on John's Island, near Charleston. (Ludwig, August 1).

Georgia: This disease has been reported from many counties and seems to be especially prevalent on the Red Bliss and Early Rose potato. The Irish Cobbler seems to be the most immune variety. (J. H. Miller, August 1).

Mississippi: Reported from Laurel and Gulfport. Doubtless present in other localities. Damage very slight. (Neal, August 1).

Ohio: Comparatively few reports have thus far this season come to our attention. (Thomas, September 1).

Minnesota: Considerable infection in the northern part of the state and the Red River Valley. (Section of Plant Pathology, September 1).

North Dakota: There is considerable wilt showing in late fields at the present time both here at Fargo and also out in the state. Apparently the total amount of infection is not much in excess of the average year. (Weniger, September 1).

Missouri: A number of specimens of this disease have been sent in. (Hopkins, July 5).

Kansas: Kansas potato soils are apparently heavily infested with this organism, for Kansas potatoes, if stored, show a high percent (80% approximately) of internal vascular browning, from which *Fusarium oxysporum* can be readily isolated. No case of wilt in the fields has been noticed, however, due probably to some ecologic factor. (White, September 1).

Montana: Numerous complaints of losses due to this disease in late June. Nothing has come in lately. None seen. July has been extraordinarily cool and rainy in most sections of Montana. (Jennison, August 1).

BLACKLEG SERIOUS IN SOME OF THE WESTERN POTATO STATES

The accompanying reports emphasize the seriousness of this disease in some of our western states:

Minnesota: Very heavy infection of blackleg (Bacillus phytophthorus) reported from the Red River Valley. Up to 5% of the plants infected in certified fields. Up to 20% in other fields. (Section of Plant Pathology, September 1).

North Dakota: Wet rot of tubers is showing up in great abundance, following the heavy infection of vines earlier in the season. The early maturing fields were more severely affected with blackleg than the later fields. Striking differences between treated and untreated seed are showing up this year. (Weniger, September 1).

Kansas: Caused considerable loss, especially in untreated fields, in some of which fully 30% of the plants were lost. The average loss would probably run around 7-8%. (White, September 1).

Oregon: General throughout the state but damage very small this year, much less than usual because there was little or no rain in any part of the state for two months after planting. (Barss, September 1).

POTATO MOSAIC REPORTS

New Hampshire: Generally present throughout the state. (Butler, August 1).

Massachusetts: Not as prevalent as usual. (Anderson, September 1).

Connecticut: No complaints; few reports; apparently less than usual. (Clinton, September 1).

New Jersey: About same as for years past. (Cook, September 1).

Minnesota: Considerable mosaic has been reported on Green Mountains. Certified Triumphs are comparatively free. In other fields of Triumphs infection ranged from 20-50-100%. (Section of Plant Pathology, September 1).

North Dakota: Very heavy infection in some fields of Bliss Triumph, particularly in north-central counties of the state. Very little mosaic in Early Ohios, but some in Green Mountains.

Kansas: Trace only in fields as previously reported. Mosaic symptoms masked in this climate. Seed was planted from known mosaic plants, but the vines appeared healthy and normal. (White, September 1).

Oregon: General and serious over the state, a real problem. The value of certified seed from carefully inspected and rogued fields is evident in the small amount of mosaic generally present in fields planted with such seed. Some commercial fields have been found with as high as 45% of the disease. (Barss, September 1).

POTATO LEAF ROLL

New Hampshire: Generally present throughout the state. (Butler, August 1).

New Jersey: More than usual. (Cook, September 1).

Kentucky: In Louisville district, particularly in the 18th Street Road district, and on growers' own stock and on Minnesota certified grown adjacent 15 to 40% on plants 6-8 inches high. (Gardner, August 1).

Wisconsin: Have seen only one plant showing symptoms of leaf roll. In Washburn County. (Vaughan, August 1).

Minnesota: A small amount of leaf roll was observed in northwestern Minnesota, but the disease was not very prevalent. (Section of Plant Pathology, August 15).

Kansas: Trace only, and those cases not pronounced. (White, July 15).
Trace only, as previously reported. It is suggested that both leaf roll and mosaic symptoms are masked due to high temperatures. It is known that we are importing these diseases each year from northern grown seed, yet the diseases do not appear in striking form. (White, September 1).

OREGON REPORTS ON THE VERTICILLIUM WILT OF POTATOES

Oregon: General throughout the state and one of the most serious causes of large losses. The use of certified seed and soil rotation result in material reduction in wilt but such practices are not general enough to make much of an impression as yet on the state situation. (Barss, September 1).

TOMATO MOSAIC REPORTS

Delaware: Very prevalent. Some fields observed with 75% infection August 4. (Adams, August 15).

Maryland: Reported from Preston, Carolina County by R. A. Jehle. One field showed 5% of vines affected. (Jehle, July 28).

West Virginia: Not common. Usually an occasional plant found in patch. (Sherwood, August 1).

Ohio: A few reports, mostly from greenhouses in the Cleveland district. (Young, August 15).

Michigan: Reported from Wayne County, July 25. Only occasional plants found in commercial fields. (Nelson, August 15).

Oregon: Reported from Marion and Polk Counties as slight. The same is probably true for the state as a whole. It is reported, however, from Crook

County that the disease is general and abundant there. In Lane County it has been bad under glass but due to better precautions this year the loss in greenhouses there has been only about 10%, according to Fruit Inspector Stewart. (Barss, August 15).

WESTERN YELLOW BLIGHT OF TOMATOES AS REPORTED FROM OREGON

Oregon: Not reported as serious in western Oregon from north to south. Reported as severe in the Umatilla Project in Umatilla County where, as usual, it is causing 50% crop loss, according to H. K. Dean Superintendent of the Branch Station at Hermiston. The same is probably true for the other Columbia Basin sections where this disease constitutes the main limiting factor to tomato production. (Barss, August 15).

FUSARIUM STEM ROT OF SWEET POTATOES IN ARKANSAS AND KANSAS

Arkansas: Widespread and severe in places. The results from certified seed and slips have been remarkable in increasing the acreage of disease-free fields. In many places the certified seed has driven all other off the market even at three to four times the price of the uncertified stuff. (Elliott, August 15).

Kansas: Prevalent in every sweet potato field. Some fields in Garden City region show 75% loss. Average loss in unselected fields, 20%. Porto Rico variety showing remarkable resistance. Growers who selected seed last year reduced their loss to 3%. (Stokdyk, September 1).

MORE REPORTS ON TOBACCO DISEASES

Wildfire (Bacterium tabacum)

Massachusetts: Due to the rainy weather during August this disease has continued to spread rapidly up to the time of harvesting. Many fields were cut before mature rather than risk any further loss from wildfire. Some fields not harvested at all. Few fields free from the disease. Many growers contemplate reducing the acreage or abandoning the growing of tobacco entirely rather than risk the same loss another year. (Anderson, September 1).

Connecticut: Serious in some fields. Has now appeared in all the tobacco towns of the state. (Clinton, September 1).

Black root rot (Thielavia basicola)

Massachusetts: Serious in a few fields, but not observed in most of them. (Anderson, September 1).

Connecticut: Perhaps the average amount, few reports. (Clinton, September 1).

Virginia: More than usual, many fields are quite patchy in appearance. (Fromme, August 1).

Ohio: Root rot caused great loss by retarding the growth of plants in unsterilized plant beds. Many growers reduced their acreage on this account and some abandoned it entirely. The weather after transplanting was unfavorable to the further development of the disease, so that the loss is largely confined to the reduced yields due to late planting and restricted acreage. (True Houser, Germantown, September 1).

Fusarium

Ohio: The plant beds of two growers near Germantown were seriously affected by a disease caused by a species of Fusarium. The leaves were thickly dotted with yellowish brown spots of considerable size and roundish outline. From a distance the plants presented a sickly yellowish appearance. Although some of the affected plants were transplanted, the disease disappeared in the field and the damage was confined to the reduction of seedlings which reached a stage suitable for transplanting. (True Houser, Germantown, September 1).

Mosaic

Ohio: Mosaic is less prevalent than any season for several years and is of practically no economic importance this year. (True Houser, Germantown, September 1).

White speck (Macrosporium tabacinum)

Ohio: This disease has not been of economic importance in Ohio, but a limited number of infected plants scattered over the tobacco areas of the state are found from year to year. There is about the normal amount of this type of infection this year. In addition, there is in Brown County, a small, heavily infected area which presents a peculiar manifestation of the disease characterized by dark colored lesions on the under side of mid-ribs of the leaves and in some cases on the stalks. The affected ribs fail to elongate while the remainder of the leaf continues to grow, producing a decided ruffling of the leaf blades. Only a minor part of the affected leaves show the white specks or spots which are ordinarily characteristic of and have given name to the "White Speck" disease. (True Houser, Germantown, September 1).

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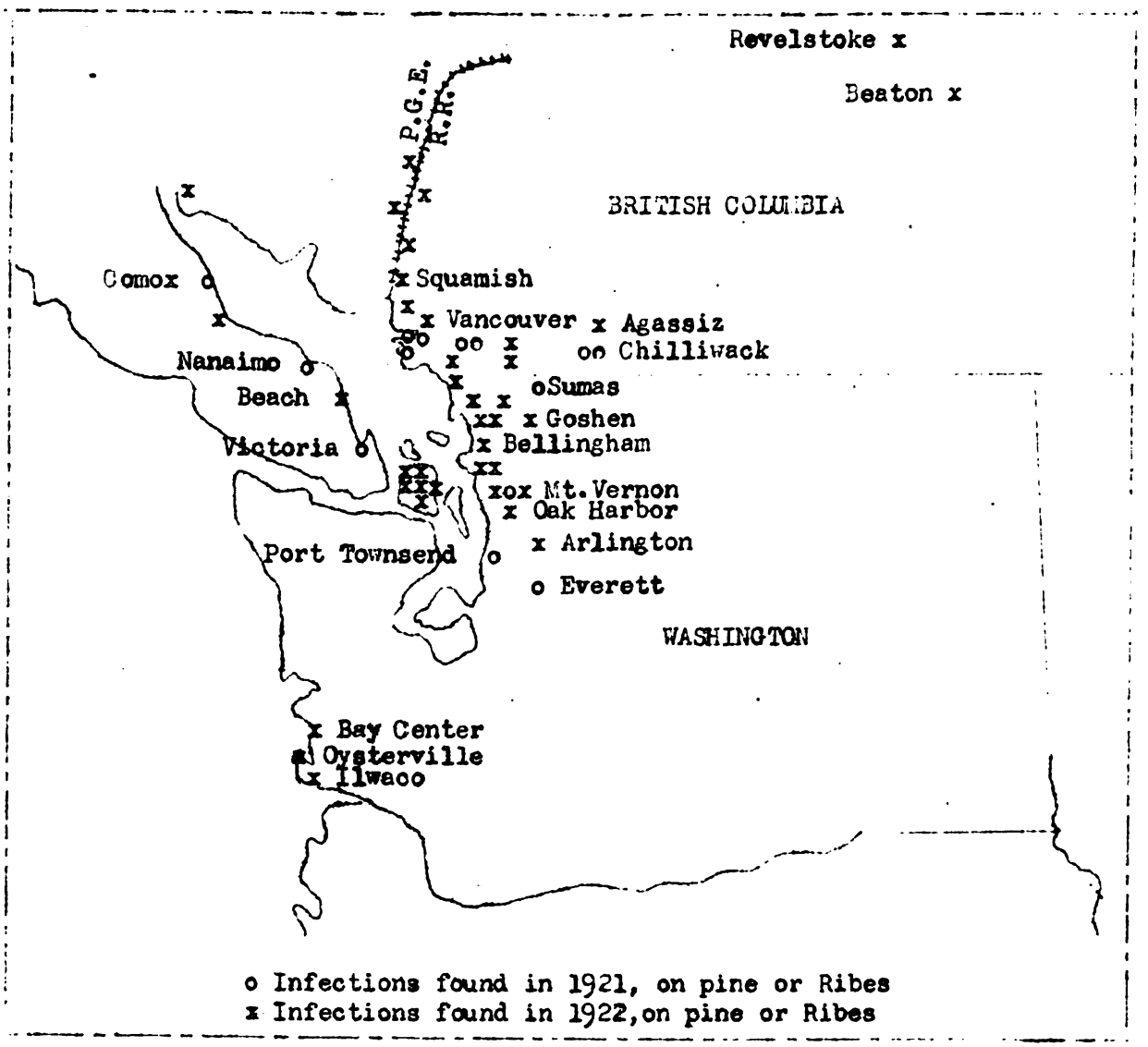

Fig. 10. Distribution of the white pine blister rust in British Columbia and Washington. (After map by Office of Blister Rust Control).

THE WHITE PINE BLISTER RUST SITUATION IN BRITISH COLUMBIA AND WASHINGTON

In the confidential news letter for blister rust workers of August 31, 1922 the Office of Blister Rust Control presents statements by L. H. Pennington, G. B. Posey, and R. G. Pierce concerning the blister rust situation in British Columbia and Washington, together with a map showing the present known geographic distribution of the disease in this same region. With the consent of the Blister Rust Office these statements and map are reproduced herewith.

Blister rust conditions in British Columbia up to July 31, 1922.

"Up to the present the rust has been found upon Pinus monticola in many places from Agassiz, some fifty or sixty miles east of Vancouver, to points beyond Thurston Bay, some 140 to 150 miles northwest of Vancouver. It has been found inland north of Vancouver 75 miles north of Squamish along the Pacific Great Eastern Railway. This is about 110 miles north of Vancouver and practically at the place where the railway passes the summit of the Cascade Mountains. This place is in the Pinus albicaulis belt and infection was found upon Pinus monticola within a few miles of an abundance of Pinus albicaulis. No infection was found upon the P. albicaulis examined. If this species is not already infected in some places, it will probably become infected in the near future.

"At North Vancouver and at Thurston Bay, infections have been found which seem to date back to 1911 or 1912; thirty miles up the P. G. E. Railway one was found which seemed to date back to 1913. Either the rust was introduced into several localities at about the same time, some ten or twelve years ago, or it was introduced into one locality several years prior to that time and had become rather widely spread by 1912. The greatest number of infections seem to be of 1916. In some places, however, there are many of 1917. In some places, as at Daisy Lake, Bold Point, and Thurston Bay, there are many more recent infections in the immediate vicinity of native Ribes. In most cases serious infections are within 100 yards (rarely 200 yards) of Ribes. There are a few instances where scattered infections are found up to a mile from the block of Ribes responsible for them. In the vicinity of Vancouver and in most places east of Vancouver, infection seems to have come largely from Ribes nigrum. North and west, however, there seems to have been more infection from native Ribes.

"The following species of native Ribes have been found infected: R. laxiflorum, R. sanguineum, G. divaricata, R. lacustre, and G. lobbii.

"These species are arranged in the order of their apparent susceptibility. Further experience, however, may make it necessary to change the order. R. bracteosum, sanguineum, and G. divaricata have been found one quarter of a mile from infected pine; R. lacustre and G. lobbii have been found one half of a mile from infected pine. Leaves of all except G. lobbii have been as heavily infected as any of R. nigrum in the vicinity of infected pines. Weather conditions have not favored uredinial spread." (L. H. Pennington, July 31).

Discovery of blister rust in another part of British Columbia

"On August 28 infection was found on black currants by the Canadian scouts at Revelstoke and Beaton, British Columbia, approximately 250 miles northeast of Vancouver. Revelstoke and Beaton are situated about 135 miles and 110 miles respectively north of the international boundary, in a valley the drainage of which is southward through the Columbia River. They lie within the belt of the western white pine in eastern British Columbia, and are directly connected with the white pine stands of the Inland Empire. Should these infections prove to be so extensive as to be beyond hope of eradication, the white pines of the Inland Empire would be directly threatened by the disease." (G. B. Posey, August 31).

Blister rust in the state of Washington, by R. G. Pierce

"In the fall of 1921, infection was found on cultivated black currants at Sumas, Mt. Vernon, Beverley Park, and Port Townsend, and on *Pinus strobus* at Mt. Vernon; the latter infection dating from 1917.

"In 1922, blister rust had been found on black currants in Northwestern Washington at Birch Bay and Deming in Whatcom County; at Edison and Clearlake in Skagit County, and on *Pinus monticola* at Blaine in Whatcom County; the infection on the latter being of 1917 origin.

"Since August 1, Mr. Posey reports 38 additional blister rust infections have been found on black currants in this section, as follows:

'Whatcom County: Birch Bay, Licking, Laurel, Bellingham (4 locations), East Bellingham, South Bellingham, Brennan, Marietta (3 locations), Ferndale, Geneva, Blaine (2 locations), Goshen.

'Skagit County: Edison, La Conner, Sedro, Woolley.

'Island County: Oak Harbor (6 locations), Green Lake.

'San Juan County: Friday Harbor, Squaw Bay, Olga (2 locations), Doe Bay (2 locations), East Sound, Port Stanley, Richardson.'

"Previous to August 1 no infections of blister rust had been found south of Port Townsend and Port Angeles, at the extreme northern end of the Olympic Peninsula. Since this date, 9 infections on black currant have been found in southwestern Washington along the coast of Pacific County, between Ilwaco and Bay Center, as follows:

Pacific County: Ilwaco (5 locations), Oysterville (2 locations), and Bay Center (2 locations).

"Scouting in this region since the location of these infections has not revealed the presence of any native white pines or the presence of the disease on any planted white pines. This fact, coupled with the severity of the infection on black currants, points strongly to the assumption that the disease may have overwintered on the black currants. Both native and planted Ribes are being carefully inspected in this region and also along the northwestern coast of Oregon, across the Columbia River from Ilwaco."

RECENT REPORTS ON CORN DISEASES

During September, corn smut (*Ustilago zeae*) has been reported by collaborators in Vermont (much more abundant than in recent years), Mississippi (common again this season, on the whole about the same as last year,

damage slight), Texas (fairly prevalent), Wisconsin (present about as usual), Colorado (observed but no definite data as to prevalence or severity).

Corn root rot, caused by *Fusarium* spp., is reported by Temple and Jehle of Maryland as severe on all varieties of sweet corn, causing a loss to that crop of about 15%. D. C. Neal of Mississippi also states that it is very prevalent, as usual, and no doubt the cause of considerable loss. In Wisconsin an undetermined fungus was causing root rot in certain old sweet corn areas.

Bacterial wilt of sweet corn, caused by *Bacterium stewartii*, is reported from Maryland and Mississippi as follows:

> Maryland: Very severe on Golden Bantam, but rarely found on the canning varieties, such as Stowell's Evergreen and Country Gentleman. (Temple and Jehle, September 1).
>
> Mississippi: Reported from Harrison County, near Biloxi by K. L. Kockerham of the Bureau of Entomology, as causing considerable damage in a garden planting. (Neal, September 1).

Black mold on corn (apparently *Aspergillus niger*) is quite prevalent in Texas where it is causing about 2% injury, according to J. J. Taubenhaus.

Corn rust (*Puccinia sorghi*) is reported by D. C. Neal of Mississippi on September 1, as follows:

> "Rather severe this season in many of the southern counties, especially on the late planted corn. Reported as particularly serious in Fayette and Pearl River Counties."

LACK OF SPRAYING APPLES THE CAUSE OF GREAT DAMAGE

The following percentages of disease were determined by Mr. F. J. Schneiderhan of the Virginia Experiment Station in a plot of unsprayed Northwestern Greening apples in the vicinity of Winchester, September 19. These determinations go to show what may happen in at least parts of the Appalachian Mountain fruit belt when spraying and other important orchard practices are neglected. Three hundred apples were counted in the plot with the following results:

Blotch	100%	Coddling moth	16%
Scab	60%	Curculio	6%
Black rot	13.3%	Scale	1%
Cedar rust	1%		

MORE APPLE SCAB REPORTS

The following reports from important northern apple states are of interest:

> New Hampshire: Diseased fruit (even Baldwins) unusually abundant. (Butler, September 1).
>
> Maryland: Scab very severe on all unsprayed orchards and even on some sprayed orchards. This disease is becoming more important in apple production each year. (Temple and Jehle, September 1).

Michigan: Very common throughout state on unsprayed trees and on trees where a delayed dormant or pre-pink spray was not applied. Early infection caused the loss of many of the young fruits. In some instances leaf attacks were very destructive and trees were almost defoliated in mid-summer. (Division of Botany, Sept. 1).

Wisconsin: More scab in Door County than usual. Especially bad on Dudley. Some fall scab showing along lake shore. (Vaughan, September 1).

APPLE BLOTCH AS REPORTED FROM MARYLAND, MISSISSIPPI, AND TEXAS

Maryland: Owing to hot weather in June, blotch appeared unusually early this year, and many orchardists did not spray early enough to control it. Loss for state 5%. (Temple and Jehle, September 1).

Mississippi: Blotch is very prevalent and severe this season, especially in the northern counties of the state. It has also been reported and specimens received from many of the southern counties. Many growers are complaining that notwithstanding the following up of the usual spraying schedules for blotch, control of the disease has not been effected. (Neal, September 1).

Texas: Quite common, 5% loss. (Taubenhaus, September 1).

MORE RECENT REPORTS ON FIRE BLIGHT OF APPLE

Maryland: Blight was more severe than during either of the past two years. (Temple and Jehle, September 1).

Mississippi: Very prevalent again this season all over the state. Damage at least 6% for the entire state. (Neal, September 1).

Michigan: In some sections very severe on young trees. Twig blight destructive in southern part of state. Fire blight over state as a whole more destructive than during an average season. (Division of Botany, September 1).

Wisconsin: No new outbreaks reported. Disease seems to have stopped running. Loss in Western orchard, Dunn County severe, especially on McMahon. This variety will be cut out in winter. Transcendent crabs were cut out last year, but did not stop the blight. (Vaughan, September 1).

COLLABORATORS' REPORTS ON PEAR BLIGHT

Maine: Past experience has shown that this disease is, as a rule, rare and of little economic importance in Maine, but have seen more evidence of it this season than during the entire 15 previous years. (Morse, August 18).

New Hampshire: Scarce and not destructive. (Butler, September 15).

Vermont: Pear blight unusually common everywhere. It seems to have spread largely this summer as the infection is only present in this year's growth. (Lutman, September 15).

Massachusetts: More than usually prevalent and destructive. (Anderson, September 1).

New Jersey: Common but not serious. (Cook, September 15).

Delaware: Very prevalent. First observed June 16. More serious on pears than apples or quinces. (Adams, August 1).

Virginia: Very general and severe. (Fromme, August 1).

West Virginia: Exceedingly prevalent and destructive this year in all sections of the state. (Sherwood, September 15).

Georgia: Fire blight is more serious at this time. The Oriental strains, which are the most immune, are dying badly this year. On trees which have had the blighted limbs cut out this summer new infections started. We have several Chinese pears two to three years old, supposed to be immune to blight and so far none has shown up on them. (Miller, August 1).

Texas: Epidemic as blossom blight early in season; now as twig blight, 50% loss. (Taubenhaus, August 1).

Ohio: This season has been a marked contrast to the two previous. Outbreaks of fire blight have become epidemic. Where rigid care has not been taken to remove cankers and infected twigs as soon as noticed pear plantings have suffered very seriously and have become a serious menace to adjoining apple orchards as well. (Thomas, September 15).

Wisconsin: About as usual. Seen on few trees. Not as bad as on apple. (Vaughan, September 15).

PEAR BLIGHT IN CALIFORNIA

In a letter from the California Fruit Exchange, dated September 16, the following interesting information concerning pear blight in the important pear state of California was communicated:

"All sections of the state from Lake County to Los Angeles, have suffered more this year from the ravages of pear blight, than any previous year in the past ten. The blight attacked the trees at different stages, from the blossoming period into the late summer. It also attacked pears half grown, to the extent that they turned black and shriveled. Many orchards have lost whole trees.

"The blight seemed to be prevalent among healthy trees of from five to ten years.

"An orchardist on the Sacramento River informed me that his loss

was about 12,500 boxes of pears out of a crop estimated at 60,000.

"Placer County, that has been practically immune from blight to any serious extent except twig blight, was hit about as hard as any district. Growers in some sections, and my own orchard included, were compelled to cut a great many trees almost to the stump. I noticed also that irrespective of the extreme care that was exercised in attempting to eradicate the blight after the infected portions of the tree had been cut and the wounds disinfected, that the blight would reappear in other portions of the tree a week or ten days later, which in many instances necessitated the tree being taken out of the ground entirely."

FIRE BLIGHT CONDITIONS IN BRITISH COLUMBIA

"In some districts of the Okanagan Valley, fire blight still remains a serious menace. During the winter months, an energetic campaign was carried on by the Provincial Horticulturist in an endeavor to get the growers to cut thoroughly, all blight cankers. A system was introduced by which all orchards were inspected and certificates given for orchards which were clean as far as could be ascertained from an inspection made by the District Representative.

"This campaign had, for the most part, a hearty cooperation among the growers and as a result, there is this year, much less fire blight in the valley than there was last year. The Salmon Arm, Westbank, Peachland, Summerland, Naramata, and Penticton districts are practically clean. At Vernon, Kelowna and Okanagan Centre where fire blight has for years been very active, the results have not been as good as in the other districts.

"It is difficult, however, to give an accurate estimate of the losses sustained. In those orchards in which the disease is active, the loss will be heavy in both pears and apples. It will perhaps be sufficient to say that, to certain larger owners, the losses will be counted in thousands of dollars.

"In these orchards, a rapid spread of the disease took place during the blossoming period; but due to weather conditions, did not at once develop. Later on, as weather conditions became more favorable, the organism became more active, causing a serious twig blight. A considerable amount of summer cutting was done as the disease first became evident; but later, this was stopped and only those branches were cut which threatened to carry the disease to important branches or trunks.

"The outlook, on the whole, is promising. If every year, as good progress can be made as was made this year, pears can yet be grown profitably in these districts. As soon as the absolute necessity of winter cutting is sufficiently impressed on the minds of the growers, the blight problem will be practically solved." (H. R. McLarty, Summerland, B. C., August).

PEAR SCAB (VENTURIA PYRINA)

Pear scab has been reported during September from a large number of states where apple scab is prevalent. It seems to be common over the northeastern and eastern parts of the country. It is reported from Washington and Oregon, but is much less severe in those states than usual on account of the dry season.

LEAF AND FRUIT BLIGHT OF PEAR ABUNDANT AGAIN THIS YEAR

Reports from Connecticut and the Middle Atlantic Coast region as well as from Illinois show that the leaf and fruit blight of pear caused by Fabraea maculata is very abundant again this year and causes serious damage. In western Maryland, pear orchards were observed where practically all the leaves had fallen on account of the disease and the fruit that remained on the branches were badly spotted. In Illinois, according to Anderson, it appeared quite generally on Kieffers which are considered more or less resistant to this disease.

FOLIAGE SCALDING OF PEARS IN WASHINGTON REPORTED BY B. F. DANA

"In many cases in commercial and private orchards extensive scalding of foliage has appeared in alarming severity. The sudden advent of dry hot weather following a cool period when water supply was abundant, seems to be the inciting factor. The Bartlett is affected most severely. The Kieffer and D'Anjou in the same situation as the Bartlett were not affected."

PEACH SCAB ABUNDANT

Judging from the accompanying reports, peach scab (Cladosporium carpophilum) has been more than usually severe this season:

Connecticut: Above the average. (Clinton, September 1).

New York: Very prevalent on Long Island. (Clayton, August 26).

Maryland: Scab was unusually severe in unsprayed orchards, causing fruit to crack and making conditions favorable for rot. Even in sprayed orchards much scab developed. (Temple and Jehle, September 1).

Ohio: Very prevalent throughout the state. Infection severe upon late varieties such as lemon free. Very excellent control accomplished wherever spraying has been thoroughly done. The leaf spot disease associated with a Cladosporium, thought to be the same organism, has caused serious defoliation in many orchards. (Thomas, Sept. 1).

Illinois: Not serious from a commercial standpoint, but quite prevalent this season. More than I have ever seen before. Usually in unsprayed orchards, Some loss in farmer's orchards. (Anderson, September 1).

Kansas: Present generally in unsprayed orchards. Seedling peaches badly affected, causing 50% of them to be worthless. Present on plums in Horticultural orchard. (Stokdyk, September 1).

Reports continue to the effect that it is present practically everywhere peaches are grown in Kansas. (Stokdyk, September 15).

California: K. A. Ryerson sends the information that scab is rather bad in places in San Fernando Valley. (W. T. Horne, August 15).

ROSETTE AND DROUTH SPOT OF PLUM AS REPORTED BY B. F. DANA FROM THE STATE OF WASHINGTON

"One very serious case of rosette on Burbank plum was observed in the Snake River section. Trees were just coming into bearing, having been set in a block from which old peach trees had been removed." (September 15).

"Drouth spot is reported as severe in the Walla Walla and Kennewick sections. Not as severe as has been reported in past seasons." (September 15).

STRAWBERRY YELLOWS

In Plant Disease Bulletin 6: 77, August 15, 1922, is given a report of strawberry yellows as it occurred in Minnesota this year. Regarding this, H. W. Anderson of Illinois writes as follows: "We observed this as serious in one variety, Minnesota No. 3, this season. Last year we observed a similar disease on another variety. I believe I reported this under 'mosaic'. It was different from the yellows observed this year in that the leaves were more curled and not so yellow."

In 1920 a "chlorosis" of strawberries was reported to the Survey from Minnesota and in 1921 Anderson reported a similar trouble from Illinois.

INFORMATION ON RASPBERRY LEAF CURL AND MOSAIC DESIRED BY THE SURVEY

Collaborators and others are asked to contribute whatever information they can on the occurrence of and losses occasioned by these two raspberry diseases. They are asked to distinguish between the two troubles wherever this is possible. For your information, we are giving a map showing the locations of counties from which these diseases have been reported to the Survey since 1908. In most cases they reported under the name "yellows".

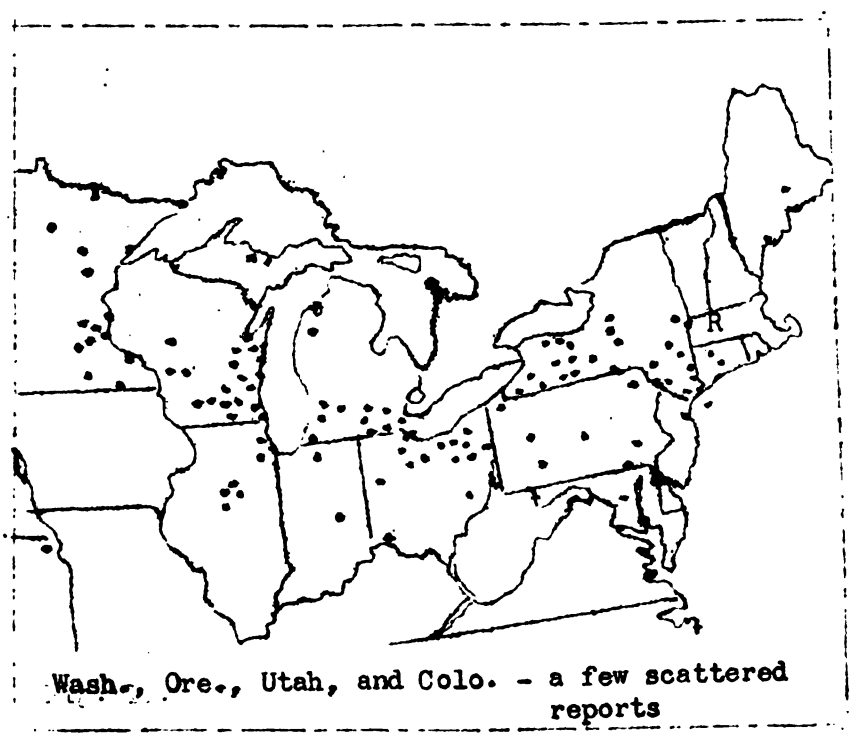

Fig. 11. Geographic distribution of raspberry yellows. (Each dot represents a county from which the disease has been reported to the Plant Disease Survey).

ADDITIONAL REPORTS INDICATING LOSS FROM BLACK ROT OF GRAPE

In addition to those quoted below, reports from New York (Orange County) and Texas state that black rot of grape is widespread and is causing considerable damage. It will be noted that the reports from New Jersey, Ohio, and Illinois mention the importance of proper spraying as a factor in reducing the loss from this disease.

New Jersey: Common but not serious where the spraying is done properly. (Cook, September 15).

Ohio: Black rot has been commonly prevalent in Ohio during the season of 1922, indeed, so generally, that no portion where grapes are grown has there been an escape from black rot. Possibly there has been developed a habit to omit the necessary Bordeaux sprays, as few grapes were matured successfully where the practice of spraying has not been followed. (Selby, September 15).

Illinois: Some loss on unsprayed vineyards. Noticed it worst on vineyards near forests along river banks. Woodbine and wild grape vines are very abundant in these parts. (Anderson, September 15).

Kansas: Fairly common this year in the southeast portion of the state, and evidently on the increase. Reported from Clay, Cherokee, Cloud, and Lyons Counties as from slight to moderate as well as from Montgomery, Labette, and Chautauqua Counties, where it was moderate to severe. (White, September 15).

DOWNY MILDEW OF GRAPE APPARENTLY UNIMPORTANT

Ohio reports downy mildew (*Plasmopara viticola*) as very prevalent but less destructive than black rot, and easily controlled by the treatment for the latter disease. Downy mildew is said to be common but unimportant in New Jersey; while in Illinois, owing to dry hot weather, it has been rarely observed. A few cases have been reported in Iowa. In West Virginia and Missouri the disease was found on wild grapes. Although it was very abundant on the wild grapes in the latter state, only a few reports of its occurrence on cultivated grapes were received (July 5). E. A. Bessey reports (July 11) that the disease was very abundant and occurred on nearly all species of grapes, cultivated as well as wild, in the Botanical Garden of the Michigan Agricultural College. None of these grapes were sprayed.

MISCELLANEOUS DISEASES OF GRAPE

Powdery mildew (*Uncinula necator*) is reported (September 15) from Ohio, where it is said to be general, but unimportant where spraying is done for black rot; and from Illinois, where it is doing damage less than last year, owing to its late appearance.

Anthracnose (*Gloeosporium ampelophagum*) is said to be unimportant in Ohio and Kansas.

Crown gall (Bacterium tumefaciens) - Ohio: Frequent upon grape and is guarded against where grape cuttings are grown (Selby, September 15).

Dead-arm (Cytosporella viticola) - Leavenworth and Lyons Counties, Kansas (R. P. White, September 15).

Root rot (Ozonium omnivorum) - very severe in Texas (September 15).

VERMONT REPORTS ON CABBAGE DISEASES

B. F. Lutman of Vermont has submitted the following reports on cabbage diseases as of October 1. Attention is called particularly to the lack of heading on sandy soils and to the fact that information on this subject is desired from other states.

> Lack of heading. My attention has been called to the local lack of heading of cabbage on sandy soils. The plants instead of heading seem to have a tendency to run up into a number of shoots or to form only leaves without a head. The plants are often dwarfed as in club root, but no disease seems to be present on the roots and there are plenty of roots.
>
> Would like to hear if other states are afflicted in the same way.
>
> Black rot (Pseudomonas campestris) occurs much more commonly than last year but is not seriously destructive. It is much above the average, however.
>
> Soft rot (Bacillus carotovorus) is much more common than last year and always spoils the heads where it gets a good start. Will be some loss from it this year, probably not over .5%.

MARYLAND AND KENTUCKY REPORT ON CABBAGE YELLOWS

Maryland: Becoming more severe every year. Loss for state 10%. (Temple and Jehle, September 1).

Kentucky: Mr. Gardner reports that in a test of the Iowa strain of Copenhagen Market (resistant), Wisconsin All Seasons (resistant), and ordinary Charleston Wakefield, the extent of infection was 5%, 1%, and 85%, respectively. This was in soil which produced a complete failure last year. (Valleau, August 15).

BACTERIAL BLIGHT OF BEAN

Vermont: (From a letter from the County Agent of Grand Isle County, Vermont's important bean section). Blight is the worst disease among the beans this year and is quite prevalent throughout Grand Isle County. Early planted beans have suffered most, as the protracted wet weather followed by a hot dry period seemed to make conditions especially favorable to blight. The late planted and replanted beans are not so badly infected. It is much more general than last year and seemed to start between the first and fifteenth of August. (Lutman, September 1).

West Virginia: Very little of this trouble seen this year. (Sherwood, August 15).

Kentucky: Practically coincident with crop. (Valleau, August 15).

Wisconsin: Widespread. Actual damage difficult to determine. Early Black Valentine very susceptible. Late Refugee quite resistant. (Vaughan, September 1).

Minnesota: Light infections in Ramsey and Hennepin Counties. About the usual amount of blight and not very destructive. (Section of Plant Pathology).

Colorado: This disease has been located in several gardens about Fort Collins, but is of no consequence. (Learn, August 15).

BEAN ANTHRACNOSE REPORTS

New Hampshire: More injurious in infected fields this year than last. (Butler, September 1).

Vermont: Anthracnose is quite generally prevalent but not nearly in so marked a degree as blight. It is, however, more general than last year. It seemed to start about the same time as blight. (From a letter from the County Agent of Grand Isle County). (Lutman, September 1).

Maryland: Very little this year. (Temple and Jehle, September 1).

Wisconsin: Not severe, too dry weather. French Horticultural, no anthracnose; Dwarf Horticultural, heavily infected. (Vaughan, September 1).

Minnesota: Moderately heavy in Hennepin and Ramsey Counties. (Section of Plant Pathology, September 15).

REPORTS ON BEAN MOSAIC

Vermont: A surprisingly small amount of mosaic. (Lutman, September 1).

Kentucky: Have found mosaic in Kentucky Wonder bean. Appeared to be seed infection. (Valleau, August 15).

Wisconsin: Sprag Early Wonder, highly susceptible; White Marrow, medium mosaic; Late Refugee, have a lot of mild mosaic. (Vaughan, Sept. 1).
Scattering plants found in most fields. Dry bean growing is not an important industry in Wisconsin. (Vaughan, September 15).

Minnesota: First observed June 16. Rather common. About as usual. (Section of Plant Pathology).

Oregon: General and often 90-100% of the plants in a field may be attacked. C. E. Stewart, Fruit Inspector, Cottage Grove, Lane County, reports relative infection of three varieties as follows: Bayos 1%, White Mexican 3%, Berrendos, free from mosaic. The crop of beans is very light on account of the drouth this year. (Barss, September 1).

ROOT ROT OF BEAN IN GRAND ISLE COUNTY VERMONT

In a recent letter from the County Agent of Grand Isle County, Vermont to B. F. Lutman, it is reported that, "Root rot was also found quite generally, the wet season favoring its development. Beans in wet low land which has been cropped to beans for two or more seasons seemed to show the greatest effect from rot. However, the amount of root rot in comparison with the blight and anthracnose is small."

The causes of this root rot are not clear, but it is known that the Fusarium martii phaseoli that occurs in New York has also been isolated from Vermont material and it is likely that this fungus is a contributing factor.

ADDITIONAL REPORTS CONCERNING TOMATO LEAF SPOT

Massachusetts: More cases reported from this state than ever before. (Anderson, September 1).

Connecticut: About as usual. One complaint of serious injury. (Clinton, September 15).

New Jersey: Abundant. (Cook, September 15).

Virginia: Defoliation from Septoria is complete throughout the western section at this date except on sprayed vines. (Fromme, September 15).

Kentucky: Reported as serious from several parts of state. More than last year. (Valleau, August 15).

South Carolina: Very common locally. I estimate a 15% loss in this neighborhood. County agents' estimates vary, but are of similar magnitude. (Ludwig, September 15).

Ohio: The leaf spot disease seems to be very much localized. For the state as a whole very slight loss occurred. In certain local sections, however, the infection is moderately severe. (Thomas, September 15).

Michigan: Many reports, general distribution in first half of season. Disease checked by hot, dry August. (Division of Botany, September 15).

Wisconsin: Less common than usual. Evidently checked by dry weather. I know of no spraying for this disease. (Vaughan, September 15).

Minnesota: Very common throughout the state. Abundant in Ramsey and Hennepin Counties, causing considerable injury to the vines in some cases. (Section of Plant Pathology, September 15).

Kansas: Present in usual amounts. This is an enphytotic disease here, causing damage each year. Reports have come in that satisfactory control was not obtained with Bordeaux this season. (White, September 15).

Colorado: This disease has not been reported from any section, but I have noticed it quite commonly in the gardens about Fort Collins. (Learn, August 15).

FUSARIUM WILT OF TOMATO

Reports from Connecticut, New Jersey, and Wisconsin indicate that Fusarium lycopersici is of little importance in those states. The following reports from states where the disease is severe are of especial interest:

South Carolina: County agents report this disease as common and causing considerable damage and we have had four specimens of of the disease submitted for diagnosis. One of these was a Norton, grown in my garden, which was killed after showing the disease for something like two or three weeks. (Ludwig, September 15).

Ohio: Losses very severe in southern Ohio. The disease is evidently spreading from year to year. It is remarkable how many home gardens there are in the state that show the presence of the Fusarium wilt disease. Sources of such infection can generally be traced to greenhouses and hot beds where plants were grown. (Thomas, September 15).

Kansas: Very severe this season, starting early in June to kill plants and getting progressively worse as the season advanced. Investigations on wilt resistance are under way and promising results have been obtained in breeding work. This disease is on the rapid increase here without any doubt, both in distribution and in destructiveness. (White, September 15).

REPORTS ON TOMATO MOSAIC FROM NEW JERSEY, MICHIGAN, MINNESOTA, AND KANSAS

In New Jersey, although it is common, mosaic is said to be less serious than usual; and in Michigan and Kansas it is apparently not very important. The following report from Minnesota is interesting:

"Quite generally present throughout the state. Very heavy in some fields in Ramsey and Hennepin Counties. Heavy infection on Solanum nigrum was found in tomato seed beds early in the season." (Section of Plant Pathology, September 15).

REPORTS OF BLOSSOM-END ROT OF TOMATO

In addition to those quoted below, reports of blossom-end rot have been received from Virginia, Michigan, Minnesota, and Washington.

West Virginia: About usual amount, but severe in a few local sections where dry weather prevailed in August. (Sherwood, September 15).

South Carolina: County agents report this as abundant, with losses running as high as 70%. This loss, however, probably includes all rots which start at the blossom end; since diagnosis, especially in the field, is difficult. Have noted a few cases locally where the disease seemed to depend on weather conditions. (Ludwig, September 15).

Arkansas: Severe on account of drouth. (Elliott, August 11).

Ohio: Following the period of extended drouth throughout August, loss due to the blossom-end rot is quite severe in certain sections, especially affected by the drouth. This caused the greatest loss of any disease. (Thomas, September 15).

Wisconsin: Fewer reports of loss this year than last year. (Vaughan, September 15).

Oregon: Not reported except from the Willamette Valley where the damage has not been large so far this year on the whole as far as reported. Fruit Inspector Stewart of Lane County, however, says that there is the usual 20-25% loss as usual except where there is irrigation in which cases there is none present. There is probably more or less of this trouble in the state wherever tomatoes are grown, although not reported often. (Barss, August 15).

A TOMATO LEAF CURL REPORTED FROM KANSAS

"Very severe about the middle of July to the first of August at Manhattan. Leaves would curl tightly and remain in that condition for two weeks or more. Some plants never recovered completely. This condition arose about ten days after a severe aphid attack. Investigations are under way with filtered plant juices to see if any filterable virus may be responsible." (White, September 15).

TOMATO LATE BLIGHT

Virginia: Prevalent at Blacksburg and other points in southwest. Injury not as severe as was anticipated earlier in the season, but 50% loss of fruit from rot is common. (Fromme, September 15).

West Virginia: On late tomatoes late blight has spread throughout the central region of the state, extending westward almost to the Ohio Valley. Infection generally rather late, however; hence not so much damage as in 1920. Some patches in mountain section a total loss. (Sherwood, September 15).

PHOMA FRUIT ROT OF TOMATO FOUND IN OHIO THIS YEAR

Fruit rot caused by *Phoma destructiva* was reported to be causing slight loss in Washington County, Ohio. According to Thomas this is the first time the disease has been observed in the state. Fromme reports the disease as common but of relatively minor importance in Virginia.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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REPORTS OF CORN SMUT (USTILAGO ZEAE)

Maine: No complaints from corn diseases have reached us this year, except possibly one or two cases of smut. Even smut is not common in Maine and when I first came here I was surprised to have practical farmers send in specimens of it and ask what it was. (Morse, October 1).

Connecticut: Common. More abundant than usual. (Clinton, October 1).

New Jersey: About the same as in the past. (Cook, October 1).

West Virginia: Corn smut very prevalent and in many cases occasions considerable damage. No fields seen in which smut was not present. (Sherwood, October 1).

Ohio: In field corn, smut infections this year are below normal. This is thought to be due to weather conditions unfavorable for the spread of the fungus. (R. C. Thomas, October 1).

Michigan: Considerable noted in College plots. May be correlated with wet June and especially with proximity of plots to locations of last year. (Coons, October 1).

Minnesota: Very common in Scott, Lesueur, Nicollet, and Blue Earth Counties, the number of infected plants varying from 1 to 10%. The amount of infection in different fields in the same locality varied greatly. (Section of Plant Pathology, October 1).

North Dakota: Abundant in the southeastern part of the state and perhaps also in other sections, on both field and sweet corn. (Weniger, Oct. 1).

South Dakota: About 1%. Most of infection on first node below tassel; some on ears. (Arthur T. Evans, October 1).

FUSARIUM ROOT ROT OF CORN

Further reports concerning Fusarium root rot of corn have been received from several states, as follows:

Connecticut: Apparently above the average. In some fields of crossed corn was serious. (Clinton, October 1).

New Jersey: About same as in past year. (Cook, October 1).

West Virginia General with the crop. No accurate data obtained as to loss, but varies considerably in different sections. (Sherwood, October 1).

Ohio: This type of root rot is thought to be much less troublesome in Ohio than that due to Diplodia. Surveys have not revealed more than one or two percent for average infected fields, and this only where a short rotation of corn after corn, or corn after wheat was followed. Where longer rotations were employed losses are very slight, provided care has been taken in the selection of seed corn. This disease is so closely interwoven with the Diplodia or ear mold that it is very difficult to differentiate the actual loss occasioned by each. (R. C. Thomas, October 1).

Michigan: Considerable noted in certain fields at College in selections for earliness. Greatest extent ever noted. Prevalence may be correlated with hot weather of July and August. (Coons, October 1).

Minnesota: A few badly diseased plants found in several fields in Washington County during September. (Section of Plant Pathology, October 1).

North Dakota: Stalks with lower nodes having brownish discolored tissue were found in several plantings at Fargo last month. The causal organism has not been determined as yet. How widespread this trouble is in the state we cannot say, since growers do not recognize this disease as yet and do not report it for that reason. With increase in corn production we may find this trouble increased also. (Weniger, October 1).

South Dakota: Slight amount. (Arthur T. Evans, October 1).

DIPLODIA ROOT ROT OF CORN IN OHIO

According to R. C. Thomas (see report quoted under Fusarium root rot) Diplodia seems to be more important than Fusarium as a cause of root rot in Ohio.

Ohio: The greater part of Diplodia infections are believed to have been occasioned through the use of infected seed. For the state as a whole infection varies from 3 to 5%. It is higher than this, however, in the southwestern part of the state. The weather throughout August and September this year was very unfavorable for the spread of Diplodia and for this reason it is believed that a grade of seed corn much above the ordinary will be available this year. (R. C. Thomas, October 1).

HEAD SMUT OF CORN REPORTED FROM WASHINGTON

B. F. Dana reports (October 1) that one field of corn near Pullman is badly affected with head smut caused by Sorosporium reilianum, and that the disease is also reported from Yakima County.

PURPLE SHEATH SPOT OF CORN REPORTED FROM NORTH DAKOTA

North Dakota: Purple spots on the leaf sheaths, as described by Durrell* 1920, have been observed in many fields this fall. In plantings on the Experiment Station grounds, it seems to be much more conspicuous in certain varieties and selections than in others, being perhaps more severe in later maturing corn than in the early crop. Stalks affected by root or nodal diseases often show more of this purple spot than healthy stalks, particularly when of a late maturing variety. (Weniger, October 1).

OTHER DISEASES OF CORN

Brown spot caused by Physoderma zeae-maydis is much less prevalent in Ohio this year, according to Thomas.

Rust (Puccinia sorghi) - reported from Minnesota (light infections in many localities), and North Dakota (light infections in this region this year; not nearly so severe as in other years).

Helminthosporium leaf blight - reported from Connecticut as bad in certain fields, and causing greater injury than usual due to the favorable weather this season.

Anthracnose (Colletotrichum graminicolum) - Connecticut (more abundant than usual, but not causing much damage).

THE BROWN BARK SPOT OF FRUIT TREES

Attention is called to the recent bulletin by D. B. Swingle and H. E. Morris of the Montana Experiment Station on the brown bark spot of fruit trees (Montana Agr. Exp. Sta. Bul. 146, Dec. 1921). This disease, which affects particularly apple and pear but which has also been observed on plum, prune, peach, and cherry, was first noticed in Montana in 1907 and since that time it has been under investigation there. Within the state, brown bark spot has not been found east of the Continental Divide, but west of the Divide the distribution is quite general, although there are many large areas free from it. Outside of Montana brown bark spot is known to be present in certain parts of Washington and it is probably in Oregon and Idaho, according to Swingle and Morris.

Without doubt the disease is non-parasitic in nature, as the writers of the bulletin have demonstrated that it is not infectious. They are inclined to the theory that it is caused by some fault in the chemical composition of the soil. However, it is possible that other non-parasitic factors may be responsible.

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*Durrell, L. W. The purple sheath spot of corn (Abstract) Phytopath. 10: 54-55. Jan. 1920.

The symptoms of this disease are well described in the bulletin and after studying these carefully collaborators and others are asked to report to the Plant Disease Survey concerning any diseases of a similar nature that they have been observing in their states. It seems very likely that this trouble has been noticed in other states than Montana and Washington and by contributing information on the subject, collaborators will be assisting greatly in the solution of the problem.

REPORTS OF APPLE DISEASES FROM THE WINCHESTER SECTION OF VIRGINIA

Mr. F. J. Schneiderhan, located at the branch laboratory of the Virginia Experiment Station at Winchester, has recently sent in the following notes concerning apple troubles in the northern part of the important Shenandoah Valley apple section.

Black rot (*Physalospora cydoniae*) is showing up more during the past week than at any other time. This disease follows injury caused by Codling Moth and Spray Burn especially at the calyx end of the apple. Bens are most heavily infected. This is typical of Black Rot infection this year. (September 15).

Bitter pit (non-parasitic) on Yorks is prevalent on approximately 35% of the fruit especially on the large sized apples. (September 15).

The severe drought of September is having a very serious effect on Staymans, resulting in a chalky lusterless color and a drying up of leaves. The leaves maintain their green color but become brittle and will probably drop off soon. (October 4).

INTERESTING APPLE BITTER ROT REPORT FROM NEW YORK

"In checking the plant disease survey report cards in this office I note this disease was reported in Sullivan County in 1917, in Columbia, Dutchess and Nassau in 1919, and in Tompkins County in 1921. Ordinarily, bitter rot is not considered of much importance in New York, at least our reports do not indicate that much stress has been placed upon the seriousness of the disease. I have never seen it in western New York and in the Hudson Valley where it has been reported most commonly it has never been considered particularly serious. I recently visited Ulster County where one grower, not far from Highland, New York, had experienced heavy losses from this disease in a block of Greenings that must have been some forty years old. The grower estimated a loss of some two hundred barrels which, judging from the effects of the disease which I saw, was not an over-estimate. (G. R. Hoerner, Cornell University, September 25, 1922)."

APPLE DISEASES REPORTED FROM ARIZONA

J. G. Brown, under date of September 1, has the following to report concerning the apple diseases of Arizona:

Crown gall (*Bacterium tumefaciens*) - present in practically all of the apple districts of the State. Lately found in Verde and Skull Valleys, in Cherry Valley

and near Miami. The occurrence of large galls on trees recently planted points to infected nursery stock. Older trees die suddenly when the fruit is about half mature, especially where a water supply is not abundant.

A fruit rot resembling bitter rot, has recently been sent in from Dos Cabesas. It is being studied in cultures at the present time.

Root rot (Ozonium omnivorum) doing considerable damage in Gila and Yavapai Counties. One orchard at Kirkland, Yavapai County, has suffered from this disease for several years. Trees on about four acres have been killed in this orchard.

PEAR SCAB BAD IN MICHIGAN

C. W. Bennett of the Botany Department, Michigan Agricultural College, reports on September 15 that scab (Venturia pyrina) is unusually prevalent and destructive on pears. In many cases sprays have not been effective because of delayed early applications.

FRUIT SCALD OF PEACH REPORTED FROM NEW YORK

New York: It might be of interest to report a condition of peach fruit occurring locally in one county which corresponds to the general description offered by H. W. Anderson under date of July 1 and September 1 in Volume 6, No. 6 of the Plant Disease Bulletin. Although there seems to be some evidence of a fungus present in the lesions, I am of the opinion that this is secondary and that the primary cause was perhaps as Anderson suggests, largely weather and particularly spray injury. (G. R. Hoerner, Cornell University, September 15).

EASTERN BLUE STEM OF THE BLACK RASPBERRY

Eastern blue stem of black raspberry has just been described by R. B. Wilcox of the U. S. Department of Agriculture (U. S. Dept. Agr. Dept. Circ. 227: 1-12, June, 1922). According to Wilcox the disease is present in northern Ohio and other sections of the East, as well as in southwestern Michigan and southern Wisconsin. The disease is serious in intensive raspberry sections where it becomes established. Eastern blue stem of the black raspberry is distinct from the leaf curl or mosaic of the red raspberry as described by Rankin, Hockey and McCurry. Although leaf curl occurs on certain varieties of black raspberries, its symptoms are different from those of blue stem. On the other hand the blue stem has not been recognized on red raspberries, Japanese wine berries, or on Eldorado or Erie blackberries. However, a disease suspected as being blue stem was found on Taylor blackberries and on a small, wild species of blackberry.

According to Wilcox, the disease is apparently of the mosaic type, although all attempts to transmit it artificially have failed thus far. All the varieties of blackberry observed by Wilcox in northern Ohio were affected, but they are not susceptible to the same degree.

It is important that more thorough and accurate knowledge be obtained as to the geographical range and seriousness of this disease and that information concerning the varieties affected and the behavior of the disease in other states be collected. The readers of this Bulletin are, therefore, asked to read Department

Circular 227 and to send to the Plant Disease Survey information that they may have on the topics just mentioned.

MICHIGAN REPORTS ON GRAPE DISEASES

The important grape state of Michigan, which in 1919 produced 115,871,465 pounds of grapes and which has a total of nearly twelve million vines, has submitted reports of grape diseases as of September 15 as follows:

Black rot (Guignardia bidwellii). Quite common early in the season on the green fruits. Checked by the dry weather of July and August. Destructive only in few cases.

Downy mildew (Plasmopara viticola). Leaf phase of disease found over entire grape growing section but causing very little damage.

Dead arm (Cryptosporella viticola). In the Michigan Agricultural College experimental field at Paw Paw, arms from 10% of the plants were removed on account of the disease. Found in nearly all of the larger vineyards but usually on a very small percentage of plants.

Anthracnose (Gloeosporium ampelophagum) present in some vineyards but causing very little loss.

LATE BLIGHT OF POTATOES CAUSED BY PHYTOPHTHORA INFESTANS

Late blight and rot will cause considerable loss in New England and New York this year and there will be damage in northern Michigan and Wisconsin. However, as will be noted from the following reports, this disease is not especially serious in Pennsylvania or southward and westward from that state, and in Minnesota and the Dakotas no blight is reported.

Vermont: Common everywhere in Vermont except in the Lake Champlain Valley. All the best potato regions have been badly hit. (Lutman, September 1).

New Hampshire: Prevalent throughout the state. Indications are that there will be heavy losses from rot. (Butler, September 1).

New York: All over the state there was much late blight on the vines but as there have been no killing frosts, farmers have not yet begun to dig, except in the extreme northern part of the state. There, rot is seldom serious and very little has been reported in the St. Lawrence Valley this season. (Chupp, October 6).

Pennsylvania: Late blight only prevalent in northern tier of counties. Loss less than five percent of total crop. (Orton and Nixon, September 25).

First report from Wayne County July 17. Loss will be light this year as compared with the past two years. (Thurston, September 30).

Maryland: Very little late blight to date. (Temple & Jehle, September 1).

Michigan: Blight limited to Upper Peninsula and a few Northeast counties. (Coons, September 25).

Wisconsin: Present in vicinity of Price County. Started on heavier soils. Tuber rot commencing. No general epidemic at this date. (Vaughan, September 1).

Minnesota: No late blight. (Leach, September 25).

North Dakota: No late blight. (Bolley, September 25).

South Dakota: No late blight. (Evans, September 25).

MICHIGAN BEAN DISEASES

R. D. Rands in charge of bean diseases in the Office of Cotton, Truck & Forage Crop Disease Investigations, sends the following reports from the important commercial bean sections of Michigan, as of September 1:

Blight (Bacterium phaseoli) generally prevalent but possibly on account of the cool season and severe drought in August it did not spread rapidly nor attack the pods until very late in the season. A wilting and subsequent dying of the plant said to be due to this organism occurred to the extent of 20 to 70% in some fields in the middle of September. Many instances were observed supporting the prevailing opinion that the variety Robust is "commercially resistant" to this disease. Three thousand acres of 20-30 garden varieties grown for seed purposes showed generally much more blight than the field type. Here "Refugee 1000-1" was generally found to show marked resistance to this disease, while Black Valentine, Currie's, and Webber Wax were among the most susceptible. In the latter group losses of 20 to 75% reduction in yield were estimated, which does not include pickage-loss in case of light seed varieties. Apparent losses were less in black seeded varieties, where, except in severe cases, blight discoloration is not observed. Its effect may be no less, however, for the southern trucker who buys the seed.

Anthracnose (Colletotrichum lindemuthianum). Until September 1 this disease was observed sporadically in most fields of ordinary Red Kidney and Navy pea varieties throughout the Michigan bean section, but although severe on individual plants it apparently did not spread. In Huron County, however, where the midsummer drought was less severe, anthracnose became general in September and will cause an estimated loss of 5 to 20%, depending upon the degree of advancement of the crop.

Root rot (Fusarium martii-phaseoli). One field of "1201" (Navy pea variety) in Lapeer County showed 50 to 80% of the plants in certain portions much dwarfed and with the typical other symptoms. The field had been plowed up and replanted but apparently fared no better than the first.

Rust (Puccinia phaseoli). Although this disease was observed generally distributed in late August and September throughout the Central Michigan bean area, it was found causing appreciable injury only in an acre comprising St. Clair and Sanilac Counties in the southern part of the "Thumb" district. There practically all the leaves were yellowing and drying up from the great numbers of pustules. Where the pods were not already mature this resulted in some loss.

SEPTORIA LEAF SPOT OF LETTUCE

H. W. Dye, formerly of New York and now with the Dosch Chemical Company, reports on September 20 that during the course of a recent trip through the New York lettuce section he found Septoria on lettuce very much more general than at any time during his experience. Differences in the susceptibility of varieties were noted.

REPORTS OF ONION SMUT

Massachusetts: Onion smut has caused more than the usual amount of damage to the crop. Formaldehyde where properly applied has given good control. (Osmun, June 28).

New York (Orange County): The first test plot to be harvested showed the following yields: Formaldehyde treated - 725 bu. per acre; Check - 348 bu. per acre. (N.Y. St. Coll. Agr. Dept. Pl. Path. & Ent. Weekly News Letter, July 31).

Ohio: (*Urocystis cepulae*). The formaldehyde drip method at planting time gives very excellent control in all sections where onions are grown with the exception of one case in northern Wayne County, where the accumulation of infectious material was so great that only 50% control was accomplished. (R. C. Thomas, September 15).

Wisconsin: Practically no loss as most growers use the formaldehyde drip where any infection is known to exist. A few small fields not treated will lose 50% of crop. (Vaughan, September 15).

DOWNY MILDEW OF ONION

Louisiana: The disease was present but no data were obtained on loss. (Edgerton, July 1).

Ohio: The presence of the disease has been noted in practically all truck sections where onions are grown, yet the loss this year has been negligible. (R. C. Thomas, September 15).

Wisconsin: Found in Pierce County on onions growing in drained swamp area. Probably reduced crop 50% on a one-acre field. Reported as minor in a few fields near Racine. (Vaughan, September 15).

Oregon: Practically none has appeared this season on account of the early and protracted summer drought. (Barss, September 15).

PINK ROOT OF ONION REPORTED FROM TEXAS, WISCONSIN, AND OREGON

Pink root (*Fusarium malli*) is reported from Texas as causing about 5% loss, and from Wisconsin as common but not causing much damage.

Oregon: Considerable evidence of root damage due to some apparent disease suspected to be "pink root" was noted in a number of onion fields

in Washington County especially where there appeared to have been insufficient soil moisture available. (Barss, September 15).

FUSARIUM BULB ROT OF ONION

Wisconsin: Widespread, and in some fields causing considerable damage. Associated with maggot injury. (Vaughan, September 15).

Washington: Crop cut about in half by thrips and Fusarium decay, the latter being bad in some fields. (Division Letter, Fruits & Veg. Div., Bu. Agr. Econ. July 27, 1922).

BLACK STEM ROT OF ONION SEVERE IN LOUISIANA

Edgerton reports black stem rot (*Macrosporium parasiticum*) to be severe as usual in the Bayou LaFourche section of Louisiana (July 1).

BACTERIAL SOFT ROT OF ONIONS IN VIRGINIA

According to Fromme (September 15) bacterial soft rot of onion is reported to be causing considerable loss in market gardens at Lynchburg.

ONIONS APPARENTLY FREE FROM DISEASE THIS YEAR IN SEVERAL STATES

Besides the report from North Dakota quoted below; those from Connecticut, New Jersey, Minnesota, and Colorado state that no diseases of onion have been reported, or that none have been found so far this season.

North Dakota: We have had no reports of onion diseases from the state this year. The crop is not extensively raised, but whenever grown, seems to do well and remain quite free from disease. This season I have not noticed any smut or downy mildew, both of which have occurred here in other years. (Weniger, October 1).

ANGULAR LEAF SPOT OF COTTON REPORTED FROM MISSISSIPPI, TEXAS, AND ARIZONA

That practically complete control of *Bacterium malvacearum* may be obtained from the treatment of cotton seed with sulphuric acid is indicated in the report from Arizona.

Mississippi: Common all over the state on the foliage. Unimportant because of the apparent lack of boll infection. (Neal, September 1).

Texas: (Boll rot (angular leaf spot) prevalent. Severe in some localities. 2% loss. (Taubenhaus, September 1)

Arizona: Black-arm became bad late in the season after the summer rains began. One company is reported to have lost between 700 and 1,000 acres. On the Salt River Valley Farm, one field of fourteen acres

practically free from the disease due to sulphuric acid treatment of the seed; another of four acres from the same original lot of seed is badly infected. (Brown, October 1).

RUST OF COTTON REPORTED FROM ARIZONA

Texas is the only state from which reports of the true rust (Aecidium gossypii) of cotton have been received by the Survey, previous to this year. The first occurrence noted in that state was in 1917, and it was also reported in 1920 and 1921. Apparently it has never caused much damage.

J. G. Brown reports its presence in Arizona this year as follows:

> "Appeared in the State for the first time during the past summer. First noticed August 29, but it had evidently been present in the field a month or more, since it was well distributed."(October 1).

COTTON ANTHRACNOSE SERIOUS IN PARTS OF MISSISSIPPI

According to Neal (September 1), anthracnose (Glomerella gossypii) of cotton is very prevalent in many parts of Mississippi this year, and is especially serious in Neshoba, Clarke, Lee, and Hinds Counties. The disease is also reported from Texas, where it is said to be unimportant.

NON-PARASITIC "RUST" OF COTTON PREVALENT IN MISSISSIPPI

Mississippi: Very prevalent this season. Many of the experimental plots at the Experiment Station were nearly two-thirds defoliated by August 15. Reported also from other parts of the state. (Neal, September 1).

OTHER DISEASES OF COTTON

Wilt (Fusarium vasinfectum) is said to be general and common in Mississippi. (Neal, September 1).

Root rot (Ozonium omnivorum) - reported by Taubenhaus as rather scarce in Texas, because of dry weather.

WISCONSIN TOBACCO DISEASES

Under date of September 1, James Johnson sent in the following information concerning tobacco diseases in Wisconsin:

Wildfire (Bacterium tabacum). First known occurrence in Wisconsin June, 1922. Found on about 90 farms in Dane County. Damage slight up to about 15% on infected crops. No spread after about July 15 owing to dry weather prevailing. Eradication attempted, in cooperation with State Department of Agriculture.

Estimated loss $5000.

Mosaic, cause unknown, is comparatively prevalent this year, accompanied by an uncommon amount of "rusting or fireing" of mosaiced plants (a result of mosaic) causing growers considerable concern. Some fields noted with as high as 99% mosaic stunted plants. Estimated loss $100,000.

Damping-off (Pythium and Rhizoctonia) - occurred to a limited extent; no serious damage done.

Root rot (Thielavia basicola), very prevalent owing to cool weather throughout the season; damage up to 50% in many fields; estimated loss from root rot $1,000,000.

Leaf spots (Non-parasitic) not especially common this year and little damage done.

Ordinary rust, caused by an undescribed bacterium, is reported as of occasional occurrence, but damage negligible.

THE PLANT DISEASE BULLETIN

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SORGHUM DISEASES IN KANSAS

Since Kansas is an important state in the production of grain sorghum the following reports of sorghum diseases from Collaborator Melchers of Kansas are of particular interest.

Red spot. This spot which has been thought to be caused chiefly by Bacillus sorghi is extremely common on most varieties of sorghum. Causes most injury on Sudan grass, other varieties not materially injured. There are apparently other factors than B. sorghi concerned in the spotting of sorghums.

Stem decay. A decay of the stalk of sorghums was noticed this season. A similar trouble has been noticed other seasons in the western part of the state. Cultural studies have given a species of Fusarium. No inoculation work has been done to prove the pathogenicity of the organism obtained. So far this trouble has not been common.

Kernel smut (Sphacelotheca sorghi). Common in fields where seed treatment is not practiced. Percentages of heads destroyed will range from a trace to 50%, depending upon variety and conditions at planting time.

Head smut (Sphacelotheca reiliana) Not common, but occurs occasionally on Red Amber Sorgo, a variety which seems to be the most susceptible of any of the sorghums. Soils once infested seem to perpetuate the disease from season to season. Seems to have been most common in the vicinity of Hays, Kansas.

MISSOURI APPLE DISEASES

H. A. Cardinell of the Department of Horticulture, University of Missouri, under date of October 17, writes as follows concerning the apple disease situation in Missouri. On account of the unusual prevalence of diseases this has apparently been a bad year for this crop in that state.

"My orchard tour which was made during the month of August at a time when most of the diseases had made their appearance, showed some very striking facts which are being brought out by other states in their monthly statements to the Plant Disease Survey.

"There is without doubt, 75% more apple blotch in the state this year than there has ever been before in the history of Missouri horticulture.

"Regarding scab, I would estimate that there is between 33 and 35% more scab this year than at any time during the past four years which covers the full period of my record in this state.

"I have never seen cedar rust as destructive in this state as it is this year and it is more noticeable on Jonathan than on any other variety coming under my observation. By the 15th of August most vigorous Jonathan trees had lost 40% of their foliage through this disease alone even in orchards receiving three or four lime and sulphur sprays. (When near cedars).

"In summing up the season as a whole, it shows that only orchards that received four and five spraying applications have 60 to 70% of a commercially clean crop and orchards receiving two and three applications do not show more than 25% of their crop that could be graded as our commercial pack of Number 1 packages, which is a condition I have not seen before in this state.

NECTRIA GALLIGENA DAMAGING TO PEARS IN OREGON

This fungus seems to be of more importance in Oregon, both on pears and apples than in any other state.

Oregon: Infections this year were late spring or early summer infections and not so common as last year. - S. M. Zeller.

Reported by Howell, County Agent of Josephine County, as rather general and doing a great deal of damage. He reports a very bad attack on Surprise pear.

In some sections of western Oregon considerable damage is present in some orchards and certain varieties of pears. (Barss, October 1).

OTHER OREGON PEAR DISEASES

Fire blight (Bacillus amylovorus). Present in service berry and other pomaceous hosts in sections of the Willamette Valley but rare in orchards.

Very little of the disease found in Douglas County this year. - Fruit Inspector Armstrong.

Appeared in Josephine County in localized areas about June 10. Was at its height about June 25. Owing to clean-up measures, damage less than former years. Damage and cost of control probably not over $10,000 in county this year. - County Agent H. B. Howell.

Rather severe in Jackson County this year. Present in Hood River and Wasco Counties, but resulting damage in orchards not reported as serious for section as a whole. (Barss, October 1).

Black end (presumptive drouth trouble). (See Third Crop Pest and Horticultural Report, Oregon Station, page 164). Reported as quite extensive in

Wasco County on dry land (unirrigated) plantings of Bartlett and Howell.

Fruit Inspector in Douglas County reports but very little this year when it has been noticed only on Bartlett.

Prof. W. S. Brown saw quite a good deal of the trouble varying in severity in the Umpqua Valley on Bosc, Anjou, and Bartlett. (Barss, October 1).

Powdery mildew (Sphaerotheca leucotricha (?). Russet from this cause is extremely light - negligible - this year. Dry weather from early part of growing season on checked mildew while warm weather perhaps improved the action of sprays used early. (Barss, October 1).

Scab (Venturia pyrina). Present throughout western Oregon, but this year the damage is very small due to dry conditions existing through spring and summer. (Barss, October 1).

Stippen (non-parasitic). Reported only from Wasco County, severity not mentioned. May exist elsewhere. (Barss, October 1).

Spray injury. Lime sulfur russet slight this year even on susceptible varieties like Bosc and Comice. In Josephine County injury was noticeable where spraying was done on hot days. (Barss, October 1).

CLIMATIC AND SOIL CONDITIONS REDUCE QUALITY OF OREGON PRUNES

Gum spot very serious in many prune orchards in Marion County, according to fruit inspector, and present in all to some extent. Some orchards on flat heavy lands lost almost entire crop, he states. Reported also from other Willamette Valley sections and from Douglas County and Wasco County. Considerable internal browning of the flesh was prevalent also in these sections. Such conditions appear to have been connected with the very dry and hot growing season. (Barss, October 1).

RASPBERRY MOSAIC, LEAF CURL, AND BLUE STEM SITUATION AS REPORTED FROM NEW YORK

W. H. Rankin of the Geneva Agricultural Experiment Station has sent in the following information concerning these troubles as he has observed them in New York this season:

> Mosaic is the most common and destructive disease of red raspberries in central and eastern New York. The disease is extremely common. The variety Perfection, universally grown in Ulster and Orange Counties, is being abandoned. The percentage infection is so high that no attempt was made to select disease free plants of this variety. New plantings of disease-free foundation stock of other varieties are being made this fall in these counties. Losses due to mosaic, even in young plantings, have caused a condition where the annual crop did not return the expense. In some cases the grower has lost money. Due to this condition many plantings have been plowed out in the last two years. (October 15).
>
> A mosaic (presumed to be the same as on red varieties) is common on many varieties of black raspberries on the Experiment Station plots at Geneva. Aphis sublphila is very common on these varieties. (October 15).
>
> Leaf curl, according to observations and reports to date is rarely

found in New York. Only a few specimens have been seen. (October 15).

Blue stem (infectious), as described by R. B. Wilcox, Office of Fruit Disease Investigations, stationed in northern Ohio, is common in black and purple varieties on the Experiment Station grounds at Geneva. (October 15).

WESTERN BLUE STEM OF BLACK RASPBERRY (ACROSTOLAGMUS) NOW IN THE EAST

The blue stem of black raspberry as described by W. H. Lawrence (Washington Agr. Exp. Sta. Bul. 108: 1912.) is now definitely reported from the East. Dr. C. L. Shear reports the isolation of the fungus from material collected in Michigan this summer, R. B. Wilcox has collected the disease in Ohio, and W. H. Rankin writes as follows from New York, October 15. A similar disease was reported from Schenectady, New York in 1917 by the Survey collaborators of that state.

> "Blue stem is a common disease in Dutchess County and at Geneva. It seems to spread very rapidly or also the sets from diseased canes are already diseased when they are planted. From the present conditions observed and according to growers statements, this disease has ruined the black raspberry industry in Dutchess County. Very few plantings remain."

OTHER RASPBERRY DISEASES REPORTED FROM NEW YORK

Crown gall is a common disease of the variety Columbian in Chautauqua County. Losses in yield were very noticeable in several plantings. This year due apparently to crown gall. (Rankin, October 15).

Powdery mildew (*Sphaerotheca humuli* (?)). A powdery mildew has caused a dwarfing of the tips of the green canes in several varieties of red and purple raspberries at Geneva. From 30 to 50% of the tips of the canes are affected. The leaves are very small, crumpled and often mottled. Only the conidial stage was found. The disease became evident during August. (Rankin, October 15).

Yellow rust (*Kuehneola albida* (Kuehn) P. Magn.). This rust is very common on several varieties of red and purple raspberries at Geneva. The older leaves are often killed. Uredinia are common on the petioles but are not found on the canes. Very little if any damage results. (Rankin, October 15).

ADDITIONAL REPORTS OF POTATO LATE BLIGHT

Vermont: Very general throughout the state. Only fields sprayed with exceptional thoroughness have escaped. Very little rot is reported so far. Acreage of certified seed reduced 25 to 50% on account of this disease. (Gilbert, October 15).

Connecticut: Appeared early and some considerable injury to late varieties by premature death of vines. Also caused more rot of tubers than usual. (Clinton, October 15).

New Jersey: Trace in Mercer County. (Cook, October 15).

Virginia: First noted at Blacksburg, August 14. Of little importance as vines were practically matured at this time. No other reports. (Fromme, October 15).

Michigan: Late blight was found fairly widespread in Upper Peninsula. The following counties have blight: Menominee, Mackinaw, Luce, Chippewa, Schoolcraft, Gogebic (trace), Baraga (potatoes wilting). Late blight was found to be general in those sections of the Upper Peninsula where the rainfall of July was four inches or more. (J. E. Kotila, October 15).

Wisconsin: More rot is showing up than the blight reported first indicated. However, rot is reported only from the heavier soil sections that had abundant rain. Will have minor effect on total state crop. Northeast and north central portion of state involved. (Vaughan, October 15).

EARLY BLIGHT OF POTATO

Although early blight (*Alternaria solani*) of potato has been rather generally reported, in most cases it does not seem to be of more importance than usual. In New Hampshire, Connecticut, and Michigan, however, it is said to be unusually prevalent, causing premature death of the plants in many fields in New Hampshire, and reducing the crop in Michigan, although to a less extent than in 1921. In Wisconsin it is prevalent on nearly mature foliage, and in Minnesota heavy infections are reported in the Red River Valley and in the northern part of the state.

The variety Green Mountain is mentioned as apparently most susceptible in Wisconsin. In two neighboring fields observed in Minnesota, Bliss Triumphs were very heavily infected and Ohios very little.

REPORTS OF POTATO SCAB

Virginia: Scab is increasing in importance in the Eastern Shore section. (Fromme, October 15).

Texas: Traces. Unimportant. (Taubenhaus, August 1).

Ohio: Reports from the present season's crop are just coming in. These indicate that the disease is very prevalent except in those fields where hill selection and seed treatment have been consistently practiced. (Detmers, October 15).

Wisconsin: Much less than last year. Not a serious factor in most sections of Wisconsin this season. (Vaughan, October 15).

South Dakota: Very prevalent, 1 to 100% loss, average 5 to 10%. Scab is very prevalent even in fields which have been treated well. Weather conditions must have some influence as well as soil conditions. (Evans, October 1).

Colorado: This disease has been noticed to be quite prevalent on the market.

but no report has been received stating it to be at all serious. (Learn, September 1).

RHIZOCTONIA ON POTATO; REPORTS FROM OHIO, WISCONSIN, AND SOUTH DAKOTA

Ohio: Very abundant. Occurs sometimes in the product of certified seed; as it is not recognized by the ordinary grower. (Detmers, October 15).

Wisconsin: About as usual. Less where seed was treated. (Vaughan, October 15).

South Dakota: Prevalent, 1 to 10% in many fields; not doing over 1% damage. Seems to be well in check. (Evans, September 1).

POWDERY SCAB (SPONGOSPORA SUBTERRANEA) REPORTED FROM MINNESOTA

Minnesota: Five percent of tubers lightly infected in a one-acre field of Irish Cobblers in St. Louis County. (Section of Plant Pathology, October 15).

AN INTERNAL BROWN SPOT OF POTATOES SERIOUS IN OREGON

Oregon: Mr. E. R. Jackman, inspector for potato certification, reports a serious potato trouble in which brown spots are present in the interior of the tuber as present in Malheur County. Many fields were graded down because of this and rather heavy financial loss resulted in some cases. It appeared to him more abundant in crops from certain lots of seed. (Barss, October 1).

CABBAGE DISEASES

Black rot (Bacterium campestre)

Vermont: There is apparently considerable trouble locally from this disease this year. (Gilbert, October 15).

New York: Common and serious on Long Island. Many young fields observed with 5 to 10% of the plants showing systemic attack due to infection through the roots very soon after the plants were set in the field. (Clayton, August 26).

Ohio: Losses have not been as great as last year. This is thought to be due to the extreme dry weather throughout August and September. (Thomas, October 15).

Wisconsin: General throughout state. Forty percent of plants diseased in some fields. Corrosive sublimate seed treatment coupled with seed bed and field rotation has given satisfactory control. (Vaughan, October 15).

Yellows (Fusarium conglutinans)

Ohio: The hot weather of the late season has favored this disease. Not so many specimens have come to our attention due to the fact that many growers consider the dry weather the cause of the trouble, yet the disease is fully as bad, if not worse than normal. (Thomas, October 15).

Michigan: Three reports of crop loss sent to department. (Department of Botany, October 15).

Wisconsin: No recent reports. New strain tests are satisfactory. (Vaughan, October 15).

Blackleg (Phoma lingam)

New York: One field on Long Island observed with 50% loss. Disease is not common. (Clayton, August 26).

Ohio: This disease is thought to have caused considerable loss this year in Ohio. It is frequently met with in markets and numerous specimens have come to our attention. (Thomas, October 16).

Wisconsin: A minor disease in most fields. A few fields visited in Outagamie County showed 50% plants infected. (Vaughan, October 15).

COTTON DISEASE REPORTS FROM SOUTH CAROLINA

Anthracnose (Glomerella gossypii). Apparently less abundant than usual, probably owing to a protracted drouth during the period when it usually develops most rapidly. A small patch of cotton planted with badly infested seed on the station farm had only a comparatively small amount of disease. (Ludwig, October 15).

Wilt (Fusarium vasinfectum). Three or four reports. This disease continues to spread in the Piedmont section. Was discovered this year on the station farm for the first time. (Ludwig, October 15).

Angular leaf spot (Bacterium malvacearum). Widespread as usual, but apparently not destructive anywhere. (Ludwig, October 15).

NEW YORK CELERY DISEASES

In 1921 New York shipped 3,084 carloads of celery. This number was exceeded only by Florida and California which sent out 4,172 and 3,387 cars respectively. The following notes from H. W. Dye on New York celery diseases are, therefore, of especial importance as far as the influence of diseases on the celery crop of the country is concerned:

"I have just recently returned from a two weeks trip through western New York state.

"Septoria blight of celery has occurred only occasionally in the past five years that I have been associated with the celery situation in western New York. Many fields this year are suffering severely from this blight. In occasional fields, I observed Cercospora blight to be decidedly destructive, but Septoria blight is general and destructive in many fields. Bacterial blight was also present in about the usual amount, but the prevailing serious blight this season was Septoria. It came as a considerable surprise to me. Those growers who applied a fungicide thoroughly, obtained perfectly satisfactory control even during the extremely favorable season for the development of blight."

HOW PREVALENT IS HELMINTHOSPORIUM BLIGHT OF CORN?

Attention is called to the reports of Helminthosporium blight of corn as reported from Connecticut, Delaware, and West Virginia in the September 15 and October 15 numbers of this Bulletin. More recent reports from Dr. G. P. Clinton of Connecticut indicate that this was the most serious disease of corn in the state this year, probably causing about 2% loss. The leaves were killed as if by early frost.

How general is this disease and is it causing much damage in other states? Complete information is desired on these points.

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THE PLANT DISEASE BULLETIN

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POTATO DISEASES IN KENTUCKY

The following reports by J. S. Gardner, Field Agent in Horticulture of the University of Kentucky, are of especial interest:

Early blight. The occurrence of early blight is spotted, some sections entirely swept as early as September 25; in others no more than 20% at killing frost. The early planted Cobblers suffered worst. A strain of Cobbler, grown by Jacob Klingenfuss, Jeffersontown, later in maturing and a decidedly heavier yielder than the majority of Cobbler strains in Jefferson County, takes the blight so late as to almost justify its reputation as being "blight proof".

Leaf roll. Among the stocks of Cobbler examined in connection with certification, the percentage of leaf roll observed was as low as 3%; in others, as high as 12-15%. Common stocks show as much as 60%. Late planted Cobbler shows less than normally planted. The Bull Moose variety is considered by many growers as completely "run out" and many fields look it, a percentage of leaf roll of 80-100%. Green Mountain is relatively free. Hoosier Boy (McCormick) yields well in spite of the 15-50% of leaf roll found on it.

Common scab is more prevalent this year than usual. The district around Worthington, Jefferson County, is worst hit, many cases of 75-100%. The management of one of our produce exchanges is considering admitting a 15% infection as "commercially free". The Green Mountain and Carman No. 2 show more scab than Irish Cobbler. Control through land treatment with sulfur appears to have some merit. With Texas Gulf inoculated sulfur and Dorsch superfine plain sulfur at 300 pounds per acre there appears to be no control but at 600 pounds there is a measurable decrease; in fact, where sulfur was found (and there was not enough moisture for the sulfur to disintegrate) no scab was found. Both forms equally effective, apparently. The yield was reduced 20% where the 600 pounds application was used.

Mosaic. Very little of the distinct mottling type, but considerable of the frilling of leaves, raised portions between mid-ribs and veins, accompanied by a sickly green color. Of the acreage in Jefferson County visited, 30% had mosaic in excess of 3%, some fields running 60%. In the gardening sections of the County the higher percentages were found.

Tipburn and Fusarium wilt. Probably the worst case of tipburn shows a percentage of less than 5. Some strains of Cobbler show as much as 3% of Fusarium wilt. Generally less than 1% in selected stocks.

HOPPER-BURN AND TIP-BURN OF POTATO

Massachusetts: Very much less tip-burn than usual. Probably on account of the wet season. (Anderson, September 1).

Connecticut: More tip-burn than usual and with late blight responsible for considerable injury, both appearing responsible for premature death of some of the late varieties. (Clinton, October 15).

Maryland: Tip-burn unusually severe in western part of state. (Temple and Jehle, September 1).

Ohio: Hopper-burn very abundant in fields where a Bordeaux spray program was not carried out. The dry weather of September favored the disease and hastened the consequent premature ripening of potato tops. (Detmers, October 15).

Michigan: Common and destructive on southern half of Lower Peninsula. Loss less than in 1921. (Department of Botany, October 15).

Minnesota: Hopper-burn was general through the state. Considerable injury done in the earlier potato growing sections. Reached the northern part of the state too late to do much damage. (Section of Plant Pathology, September 1).

South Dakota: Hopper-burn was very common in unsprayed fields; up to 20% damage. (Evans, October 1).

POTATO LEAK CAUSED BY PYTHIUM OR RHIZOPUS REPORTED FROM TEXAS AND MINNESOTA

Traces of this disease occurred in the Texas fields at digging time. Nearly 1% loss was estimated by J. J. Taubenhaus.

About 15% of the tubers in an acre plot at University Farm, St. Paul, Minnesota were ruined early in October according to a report from the Section of Plant Pathology.

SWEET POTATO DISEASE REPORTS

Fusarium stem rot caused by Fusarium spp.

South Carolina: Six records for the crop of 1922. This shows a greater distribution and abundance in the state than we had suspected. Some of them were very light infestations, others severe. Some of the severe ones were first infestations due to buying diseased plants. We are making it the policy of the Botany Division here to encourage the home production of as many farm and garden seeds as can be done, in order to prevent disease dissemination. (Ludwig, November 1).

Mississippi: Common, but not nearly so serious as in former years. (Neal, October 15).

Arkansas: Generally distributed, severe in some places. (Elliott, November 1).

Kansas: Losses as high as 75% in Garden City district. Average about 10% there. Yellow Jerseys show most infection. Porto Rico shows marked resistance, although not immune. Hill selected potatoes show a reduction of disease, in one plot selected showed trace while unselected showed 15%. (Stokdyk, October 15).

Black rot caused by Sphaeronema fimbriatum

Mississippi: This disease, although common on the crop now being harvested, is not nearly so serious as was the case two or three years ago. Growers are informing themselves as to this disease, and are insisting on healthy seed stock and plants. (Neal, October 15).

Louisiana: More or less common in all parts of the state and in some localities causing considerable loss. (Edgerton, November 1).

Arkansas: Less than usual. Dry weather probably affected reduction. (Elliott, November 1).

Kansas: Present to the extent of 15% in untreated fields. Treated fields free. Average loss for the state about 3%. (Stokdyk, October 15).

Soil rot caused by Acrocystis batatae

Kansas: Severe in some fields; 20% loss reported in one field. (Stokdyk, September 1).

Three percent average damage for state where control measures were not practiced. (Stokdyk, October 15).

Scurf caused by Monilochaetes infuscans

South Carolina: Present and apparently rather common. (Ludwig, November 1).

Mississippi: Very few reports have been received so far. Becoming less prevalent. (Neal, October 15).

Kansas: Present in most fields. Damage not severe. Treated seed free from the disease. (Stokdyk, October 15).

Mosaic (cause undetermined)

Arkansas: Traces found in most Nancy Hall fields. (Elliott, Nov. 1).

Charcoal rot caused by Sclerotium bataticola

Louisiana: More or less common, but of minor importance. (Edgerton, November 1).

DOWNY MILDEW INJURIOUS TO CABBAGE SEEDLINGS IN PARTS OF CALIFORNIA AND FLORIDA

Under date of October 15, W. T. Horne of the University of California, writes that downy mildew was reported from Oxnard, Ventura County, where it was causing serious injury to very young plants in the seedbed. Cotyledons were attacked and apparently destroyed and plants said to be killed.

In Florida, W. B. Tisdale found the disease doing considerable damage in plant beds this year and probably killed 20% of the plants in certain beds or rendered them unfit for use. Collards were less severely affected than cabbage. The disease was checked to some extent by spraying the seedlings with 3-3-50 Bordeaux.

CELERY DISEASE REPORTS

Late blight caused by Septoria petroselini apii

Connecticut: Bad but probably not as bad as at first threatened, as fall was fairly dry. Probably more than average amount. (Clinton, November 1).

Pennsylvania: Late blight severe in many sections; 40% loss reported in Lancaster County, and 15% loss in Philadelphia County. Spraying has failed in several instances this year. (Thurston, November 1).

Michigan: Extremely severe in all regions where celery is grown extensively. Loss practically total with last crop. Muskegon and Kalamazoo areas suffered most. (Coons, November 1).

Early blight caused by Cercospora apii

Connecticut: At least the average damage and perhaps more. (Clinton, November 1).

New York: In occasional fields I observed Cercospora blight to be

decidedly destructive. Those growers who applied a fungicide thoroughly obtained a perfectly satisfactory control even during the extremely favorable season for the development of blight. (H. W. Dye, October 18).

Michigan: Not prevalent. (Coons, November 1).

Bacterial leaf spot caused by Pseudomonas apii

New York: (Western) Bacterial blight was also present in about the usual amount. (Dye, October 18).

Michigan: Common and rather disfiguring on Golden Self-blanching celery at Niles and Decatur. (Coons, November 1).

Minnesota: We have found a bacterial leaf spot on celery which is apparently caused by Bacterium apii. This is the first time we have found this disease. (Louise Dosdall, August 2).

Yellows caused by Fusarium sp.

Michigan: As usual. Known from practically all celery growing areas. (Coons, November 1).

TEXAS AND ARKANSAS REPORT ON COTTON DISEASES

Wilt caused by Fusarium vasinfectum

Texas: Fairly prevalent in the light sandy soils; 1% loss. (Taubenhaus, October 15).

Arkansas: Much less damage than usual due to dry weather. Some fields considerably injured but practically no damage on "buck-shot" land. (Elliott, October 15).

Anthracnose caused by Glomerella gossypii

Texas: Traces. Unimportant. (Taubenhaus, October 15).

Rust caused by Aecidium gossypii

Texas: A sudden outbreak in Laredo. Quite severe. Amount of loss not yet determined. (Taubenhaus, October 15).

Root rot caused by Ozonium omnivorum

Texas: Not so prevalent this year due to dry weather; loss about 5%. (Taubenhaus, October 15).

Boll rots caused by Colletotrichum, Bacterium malvacearum, etc.

Texas: Quite prevalent; 2% loss. (Taubenhaus, October 15).

Arkansas: Very little, due to dry weather; less than any other year since I have been here. (Elliott, October 15).

Sooty mold (cause undetermined)

Arkansas: This sooty mold has done some damage on dusted cotton, following honey-dew secretion by aphids. Lint is blackened and grade lowered. (Elliott, October 15).

Sunburn (physiological)

Arkansas: More than ordinary, especially on bolls blackened by sooty mold. In many cases, boll rots have followed the sunburn injury. (Elliott, October 15).

SUGAR CANE DISEASES AS REPORTED FROM LOUISIANA

C. W. Edgerton of our important sugar cane state of Louisiana reports as follows concerning sugar cane diseases as of October 15:

Mosaic occurs in all parts of the sugar belt. No way of estimating loss, but it is not as large as has been predicted.

Root rot caused by *Marasmius plicatus* is common and causing considerable loss. As usual, one of our most serious diseases.

Red rot caused by *Colletotrichum falcatum* is common and causing about the usual loss.

LATE REPORTS OF FIRE BLIGHT OF APPLE

Recent reports (November 1) from several states concerning fire blight of apple indicate that the late season progress of the disease is less than might have been expected from its general prevalence and severity earlier in the year. Clinton states that there is an average amount in Connecticut, but it is not serious, although in early summer it caused conspicuous injury and death of young twigs. In New Jersey it is said to be common on susceptible varieties. Michigan reports the disease as occasional with no severe damage except early blossom blight of Duchess. J. G. Brown states (September 1) that there has been some fire blight noted in Verde, Skull, and Cherry Valleys, but that it is not bad at this time of year.

The reports from Kentucky and Ohio are quoted:

Kentucky: During early spring a severe outbreak throughout the state. Transparent, Jonathan, Rome, Wealthy, Summer Queen, and Winter Banana very susceptible. Also found on almost all varieties. One Golden Delicious tree, which is claimed to be immune, was affected. No development seemed to come after the middle of June. Apparently the limbs did not canker back into larger branches. Many of the trees seemed to completely outgrow the blight damage.

Pear trees almost all killed with blight. The most progressive apple growers are removing pear trees. (W. W. Magill, November 1).

Ohio: Development in later season has been very much less than is normally expected. In general, the spread of blight infection has been limited. (Selby, November 1).

REPORTS OF APPLE BITTER ROT

The contrast between the reports from Pennsylvania and West Virginia on the one hand, and that from Ohio on the other, is interesting.

Connecticut: More common than usual but only little injury. Only two or three reports. (Clinton, November 1).

Pennsylvania: Seems to be worse than common in southeast part of state. Noticed especially on York Stripe. (Nixon, November 1).

Virginia: Common on early varieties in home orchards in Piedmont and middle sections but of only slight importance in commercial orchards of late varieties. Less than the average year. (Fromme, September 1).

West Virginia: This is the first season that bitter rot has appeared in any appreciable quantity in the important fruit growing counties of eastern West Virginia in my observations in the last nine years. (Berg, October 3).

Arkansas: This disease started out badly in July but was checked by dry weather following. Late apples showed no infection. (Elliott, November 1).

Ohio: There is seldom a season in which there is less bitter rot on apple in Ohio than during the summer of 1922. One or two collections of specimens have been made but no marked occurrences or localized outbreak. (Selby, November 1).

SOOTY BLOTCH AND FLY-SPECK OF APPLE NOT IMPORTANT

These two diseases are reported (November 1) as not important at all in properly cared for orchards. In Maine they are said to be more prevalent than usual but are apparently causing damage only to unsprayed fruit. In Connecticut there is the average amount of both diseases, with sooty blotch, as usual, somewhat more abundant, but not especially conspicuous. Sooty blotch is the more common in Ohio also but both diseases are rare in the state this year, due to the generally prevailing drouth during September. W. W. Magill reports the varieties Grimes, Mann, Delicious, Ben Davis, Winesap, and Stayman as most affected in Kentucky.

FRUIT SPOT (PHOMA POMI) OF APPLE

Connecticut: Conspicuous but probably not much more than the average amount and confined chiefly to unsprayed or poorly sprayed and dusted trees. (Clinton, November 1).

Arkansas: Considerable on Grimes and Jonathan; some on other varieties where not well sprayed. (Elliott, November 1).

Ohio: The importance of this disease in the state is demanding more attention from year to year. This year has been found to be especially serious upon Jonathan, Rome Beauty, Ben Davis, and Grimes varieties. In some orchards it seems to rival scab in occasional loss. (Thomas, November 1).

REPORTS OF APPLE BLOTCH (PHYLLOSTICTA SOLITARIA)

New Jersey: Very rare except on Smith Cider. (Cook, November 1).

Kentucky: Common throughout the state. Especially bad on the following varieties: Ben Davis, Rome, Maiden Blush. Less noticeable on the following: King David, Arkansas Black, Jonathan, and Wealthy. In most cases where two thorough Bordeaux sprays were applied, it was controlled. When old cankers are present, a thorough control does not seem possible the first year. To the commercial grower of Kentucky this disease is not so serious as the scab, due to the fact that most of the varieties grown commercially are not susceptible. (Magill, November 1).

Arkansas: Bad on susceptible varieties where not properly sprayed. (Elliott, November 1).

Ohio: It was reported September 1 that apple blotch had showed less than previous season. This has continued to prove true where the necessary applications of Bordeaux mixture had been made. On the other hand the number of unexpected occurrences and collections reported by orchardists and Farm Bureau workers have been very large. Cases on Northwestern Greening extended development were sent from the central and northwestern portions of the state, while apples shipped from the Rome Beauty areas have contained infection where not thoroughly sprayed. The development of the Phoma spot over a similar seasonable period for 1922 emphasizes again the importance of the applications of Bordeaux mixture to insure marketable apples. (Selby, November 1).

Kansas: Severe in every unsprayed orchard. As high as 80% in some cases. Average loss of state, 10%. (Stokdyk, November 1).

ADDITIONAL REPORTS INDICATE CONTINUED SEVERITY OF APPLE SCAB

Maine: On account of continued rainy weather in spring and early summer, the season has been very favorable for the development of scab. Were it not for a short crop and low prices, the monetary loss from scab would be considerable. Unsprayed Ben Davis apples gave over 75% scabby fruit, while thorough spraying reduced the amount to less than 20%. (Morse, November 1).

Connecticut: Bad. About same or worse than last year, and worse than average

years. Early threatened to be the heaviest infection for years, but later let up somewhat. The worst disease of the year for this host. (Clinton, November 1).

New Jersey: Quite general and very abundant in some localities. (Cook, November 1).

Virginia: General throughout the state but especially prevalent and severe in the northern part of the Shenandoah Valley. Losses will exceed those of previous years. (Fromme, September 1).

Kentucky: Found in every orchard in state. Especially bad on the following varieties: Delicious, Winesap, Ben Davis, Stayman, Black Twig, Early Harvest, Rome, Champion, etc. This past season many growers were unable to control it with their regular spray schedule. This may have been due to rains for several days following the spraying. (Magill, November 1).

Arkansas: Not severe. (Elliott, November 1).

Ohio: The conditions reported September 1 have been a marked feature of the season. The current showers extended infection to the foliage which was not maintained in extended severity during the general drouth of September and early October. This has led to earlier dropping of scab infected leaves than normally occurs with reduced proportion of diseased leaves to drop at end of season. It is now felt that the leaf infection may prove less than promised to occur on September 1, yet it is certainly serious. (Selby, November 1).

Michigan: Extremely severe. Maturity of ascospores too early for ordinary sprays to be efficient. With pre-pink sprays, control much better. Dusting not successful generally. Loss in general about 16%. (Coons, November 1).

Kansas: More severe than usual. One orchard of Delicious showed 95% infection with 50% unmarketable. (Stokdyk, November 1).

SEVERE HAIL INJURY TO APPLE FRUIT REPORTED FROM MAINE

"Quite a section of the apple belt of Maine suffered from the effects of a severe hail storm which occurred in September when the fruit was nearing maturity. Much good fruit was rendered unsalable on account of bruises and even actual cuts in the skin." (Morse, November 1).

IMPORTANT RASPBERRY DISEASES IN ILLINOIS

Under date of November 10, Prof. A. S. Colby of the Department of Horticulture, University of Illinois, sends in the two following interesting notes concerning crown gall and eastern blue stem of the black raspberry:

"Crown gall is the limiting factor in red and black raspberry culture in many sections of Illinois. This disease, coupled with

anthracnose, has put many growers out of business the last few years. These diseases are being spread still more widely by nursery stock, much of which is infected.

"Eastern blue stem, as recently described by R. B. Wilcox, has been found in black raspberry plantations about Peoria and bids fair to become a serious menace to the black raspberry industry there. One grower stated that he secured his plants from a Michigan nursery when the plantation was established four or five years ago."

PECAN DISEASES

Scab caused by *Fusicladium effusum*

South Carolina: Apparently not especially severe this season. Have had two specimens submitted for diagnosis. (Ludwig, November 1).

Mississippi: Scab was serious again this season along the Gulf Coast, in the Delta counties, and in many localities in the central eastern part of the state. In many groves where susceptible varieties are planted, the crop was a total failure as a result of scab. A number of the large growers in the state are equipping themselves with power sprayers and are spraying for scab control. (Neal, October 15).

Louisiana: Common and the cause of considerable loss on some varieties. (Edgerton, November 1).

Arkansas: Several reports. I do not know how bad it is. (Elliott, November 1).

Rosette (cause undetermined)

South Carolina: Three complaints; in two of which the damage was said to be considerable. Probably quite general. (Ludwig, November 1).

Mississippi: Rosette is becoming common in many of the southern counties. Observed and reported this season from Jackson, Harrison, Pearl River, Clarke, and Lauderdale Counties. (Neal, October 15).

Black pit (cause unknown)

Mississippi: Black pit, a disease, and apparently a physiological trouble, was very destructive all over Mississippi the past season. After the nuts attained considerable size, the husk tissues became black and somewhat pitted, and finally resulted in heavy shedding. The Fruit Disease Pathologist attributes this condition to dry weather the year previous, but although possible, this theory is uncertain. (Neal, October 15).

Nursery blight caused by *Phyllosticta caryae*

Mississippi: Common again in many nurseries, but not serious. (Neal, October 15).

Mildew caused by Microsphaera alni

South Carolina: One complaint. In this case the nuts were considerably damaged but could not be sure that this fungus was responsible. (Ludwig, November 1).

Dieback caused by Botryosphaeria berengeriana

South Carolina: One complaint. Disease accompanied and probably preceded by rosette. (Ludwig, November 1).

Brown leaf spot caused by Cercospora fusca

South Carolina: Two requests for diagnosis. Probably not very destructive. (Ludwig, November 1).

Leaf spot(cause undetermined)

Louisiana: Very common and responsible to a considerable extent for the early defoliation of the trees. (Edgerton, November 1).

THE WALNUT BLIGHT SITUATION IN OREGON

"Bacterial blight caused by Bacterium juglandis was reported as general throughout the walnut growing sections of Oregon with 10 to 15% of the crop affected. The damage this year was, however, small as compared with the average year, probably due to the early and prolonged dry weather the past season." (Barss, October 15).

GREEN SPOTTING OF CITRUS FRUITS IN FLORIDA

O. F. Burger of the Florida Experiment Station writes as follows on October 28:

> "Recently I have found a considerable number of the oranges going on the northern markets affected with a green spotting. Most of these oranges are of the Parson Brown variety which have been artificially colored. A slight bruising liberates the oil from the cells and this oil on the oranges does not allow them to color up in the coloring room."

Market inspectors and pathologists are asked to watch Florida citrus fruits for this green spotted condition and to send whatever information they may gather to the Plant Disease Survey.

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40 Read "Mycosphaerella brassicicola" instead of "Mycosphaerella brassicae".

60 Read "Root knot (Heterodera radicicola)" instead of "Root rot".

66 Under Kansas, read "Apple blight" instead of "Apple blotch".

92 Read "Aplanobacter michiganense" instead of "Aplanobacter michigense."

97 Read "Bacterium tabacum" instead of "Bacterium tobacum".

112 Read "Verticillium" instead of "Verticilium".

125 Read "Cryptosporella viticola" instead of "Cytosporella viticola".

136 Puccinia phaseoli is a synonym for Uromyces appendiculatus.

151 Read "Cystospora batatae" instead of "Acrocystis batatae".

153 Read "Aecidium gossypii" instead of "Acedium gossypii".